International bibliometric benchmark
Institute of Physics, University of Amsterdam
New mission-tailored approach in support of SEP evaluation 2024

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Executive summary

We here present the results obtained with a novel approach based on Elsevier's Topics[1] classification. By pooling the Institute of Physics (IoP)'s major Topics into a custom SciVal Research Area, a fingerprint of the institute's academic 'niche' has been obtained, further referred to as the IoP Core Area. A range of bibliometric indicators for IoP and UvA have subsequently been compared with those of the world's most active academic institutions in the IoP Core Area. This has resulted in a benchmark, tailored to the disciplinary main orientation of IoP, as required by the Dutch Strategy Evaluation Protocol 2021-2027 (SEP).

This benchmark comprises three parts:
1. Composition IoP outputs and Core Area
2. Bibliometric benchmark European Top-12 and international Top-30 Universities in IoP Core Area
3. 2010-2022 trends in IoP Area

We show that IoP's 25 largest Topics provide a representative selection of 48% of its SciVal publications, reflecting its main research foci and sufficiently covering all three divisions.
Considering the top European institutes in the IoP Core Area, the University of Amsterdam (UvA) ranks tenth in publication number and eighth in FWCI. UvA's papers tend to have fewer co-authors from different institutions, resulting in respective fourth and third positions in author and institute fractional FWCI scores. Please refer to Table 7 for an overview of ranked European institutes.
Among academic institutions within the IoP Core Area globally, UvA holds the twenty-seventh position in terms of paper count. Within the global top 30, UvA secures the twenty-second position for total citation count and fifteenth for the 'crown indicator' FWCI. However, UvA ranks last in Topic Prominence among the top 30 institutions, suggesting that publications from the IoP Core Area are comparatively less visible than those from other top-ranking institutions. Topic Prominence is computed based on citation count, Scopus view count, and CiteScore[2], where UvA scores twenty-second in citation count, fourteenth in view count, and twenty-second in CiteScore. For a comprehensive overview of all metrics and benchmark institutions, please refer to Table 6.
In the IoP Core Area, UvA proudly exhibits a field-weighted citation impact of 3.64, underscoring an impact that surpasses the global average by three a half times.
The IoP Core Area has witnessed a steady rise in global activity from 385 publications in 1996 to 14209 publications in 2022. The UvA demonstrates a consistent output in terms of publication numbers in the IoP CA in recent years. When compared to other top institutes (within the top 30), it exhibits a slight upward trend.
Please refer to Table 9 for an overview of the activity in the Core Area between 1996 and 2022.

1 In Scopus/SciVal each publication with sufficient citations or references is linked to one of appr. 96.000 *Topics*, representing collections of documents with a "common focused intellectual interest". These are determined with a clustering algorithm based on extended direct citations, developed by the Leiden CWTS (Waltman & van Eck 2012 and Klavans & Boyack 2017). Unlike traditional journal classifications such as Elsevier's ASJC (with ±330 subcategories) or Clarivate's (±254) WoS research areas, *Topics* are completely independent of journal classification. An important advantage of this new classification is the lack of overlap: a paper is assigned to no more than 1 *Topic*, as opposed to the up to 13 ASJC labels that journals (and all their articles) may receive. In addition, *Topics* represent real disciplinary micro niches that tend to be well recognized by active authors as (one of their) own areas of expertise.
2 Prominence is an indicator of the momentum/movement or visibility of a particular Topic. Prominence does not signify 'Importance'. Calculating a Topic's Prominence combines three metrics to indicate the momentum of the topic: Citation count in year n to papers published in n and n-1; Scopus views count in year n to papers published in n and n-1; Average CiteScore for year n. Link

Method Visualisation

1. Pure

Current Research Information System

What?

Source data.
Publication info: authors, title, DOI, journal, year of publication.

DOIs

2. SciVal (via Scopus)

Database

What?

Unique identifiers (DOIs), metrics (15): including FWCI, # authors, CiteScore, citations, views…

3. Data enrichment

Supplementing source data

How?

Adding publications found in Scopus to the source data.
Adding SciVal metrics to all records.

4. Defining IoP Core Area

Unique fingerprint of IoP's niche

How?

Pooling IoP's major topics into a custom Scival Research Area. IoP's 25 largest topics provide a representative selection of **48%** of its publications, reflecting the main research foci of all three divisions (IHEF, ITFA, WZI).

5. Identifying peer institutions

How?

(Inter)national collaborations were excluded from the benchmark, so that the benchmark could be conducted at the university level.

6. Collecting data for peer institutions

How?

The same 15 SciVal metrics were collected for the 30 most active institutions in the IoP Core Area globally.

7. Benchmark

Comparing IoP's performance against that of: I) academic peers worldwide; II) academic peers within Europe

Part 1. Composition IoP outputs and Core Area

SciVal coverage and output types

Table 1) SciVal coverage of Pure registered IoP publications (download Pure, December 2023)

TYPE OF OUTPUT	SCIVAL	PURE	SCIVAL COVERAGE
ACADEMIC PUBLICATIONS			
ARTICLE	2.144	2.043	
REVIEW	60	-	
CONFERENCE PAPER	32	23	
	2.236	**2.066**	
OTHER SCIVAL TYPES	35	-	
	2.271	**2.066**	**110%**
OTHER PUBLICATIONS			
BOOK (AUTHORED)	1	4	
BOOK CHAPTER	11	18	
	2.283	**2.129**	**107%**
PHD THESES	-	164	
OTHER PURE TYPES (WITH UNIQUE IDENTIFIER)	-	41	
PUBLICATIONS WITHOUT UNIQUE IDENTIFIER	-	50	
	2.283	**2.384**	**96%**

We added around hundred publications found in Scopus to the Pure IoP dataset. Table 1 indicates that SciVal covers 96% of Pure publications for the period of 2017-2022. It is important to note that Pure and SciVal use different definitions for publication types (Pure is the current research information system (CRIS) used by the University of Amsterdam).

Table 2) Comparison OA types UvA publications in IoP Core Area 2017-2022

	#P	%P	#C	%C	FWCI	SD FWCI	FWTOP%	NR AUTH	FWCI/ AUT	NR INST	FWCI/ INST	TOP PROM	CITESC	SNIP	VIEWS/
BRONZE	99	4,34%	5205	5,98%	12,86	6,46	26,25	231,62	1,86	43,47	2,89	93,16	15,26	1,70	55,37
CLOSED	112	4,91%	1869	2,15%	1,13	1,79	42,61	5,21	0,51	3,18	1,47	90,74	22,00	1,91	27,71
GOLD	851	37,28%	33649	38,65%	2,95	6,80	22,49	1155,39	0,26	108,19	0,34	94,65	9,80	1,47	138,73
GREEN	678	29,70%	18497	21,25%	1,91	2,65	29,92	62,53	0,40	14,05	0,52	92,93	13,95	1,53	28,73
HYBRID	543	23,78%	27845	31,98%	3,59	7,71	23,91	813,48	0,30	82,94	0,42	93,75	11,76	1,62	114,88
ALL	2283		87065		2,71	5,92	26,19	653,03	1,09	66,25	0,43	93,67	12,34	1,55	91,33

Table 2 highlights that over 90% of the Institute of Physics (IoP) output, as documented in SciVal, is freely accessible and usable through Open Access. Closed-access publications, comprising less than 5% of the total, exhibit the lowest Field-Weighted Citation Impact (FWCI), receive fewer citations, and attract fewer views compared to other access types. On the other hand, Gold and hybrid publications demonstrate significantly higher FWCI (three times and three and a half times the world average impact, respectively) and garner substantial views. Green publications, while similar to closed publications in terms of views, show comparable impact. Notably, Bronze publications—constituting less than 5%—are freely available only on the publisher's website without a clearly identifiable license. Despite this, they exhibit a high FWCI compared to other access types. This suggests that publishers may selectively opt to offer high-impact

closed-access publications solely on their platforms without licensing them for reuse. Consequently, due to their limited utility, we, along with the Association of Universities in the Netherlands, classify Bronze publications as closed-access publications.

The 15 metrics shown in Table 2) are:
1-4: the number and % of publications (#P, %P) and citations (#C, %C),
5: Field-Weighted Outputs in Top Citation Percentiles, per percentile,
6-7: Field-Weighted Citation Impact (FWCI, incl. standard deviation),
8-11: number of co-authors and co-authoring institutes and corresponding fractional FWCI scores (FWCI/Auth, FWCI/Inst)
12: Topic prominence,
13-14: two journal impact indicators, CiteScore (comparable to Clarivate's JIF) and SNIP (a field normalised alternative), and
15: Views counts are generated from usage data in Scopus. The metric is the sum of abstract views and clicks on the link to view the full text at the publisher's website. See App.1 for the definitions.

Contribution IoP divisions

Table 3) IoP divisions and SciVal metrics

	#P	%P	#C	%C	FWCI	SD FWCI	FWTOP%	NR AUTH	FWCI/ AUT	NR INST	FWCI/ INST	TOP PROM	CITESC	SNIP	VIEWS/
IOP	2283		87065		2,71	5,92	26,19	653,03	0,32	66,25	0,43	93,67	10,09	1,55	91,33
WZI	659		15044		1,42	2,21	35,36	6,56	0,29	3,68	0,56	92,71	12,38	1,92	29,10
ITFA	944		27104		1,98	2,70	28,51	13,32	0,53	6,71	0,61	92,44	8,92	1,36	17,01
IHEF	749		47407		4,74	9,40	15,42	1974,69	0,07	191,60	0,11	96,20	9,54	1,47	234,69

Table 3 provides an overview of the IoP divisions based on the same 15 SciVal metrics as listed in Table 2. Definitions of these metrics can be found in Appendix 1.

From 2017 to 2022, the three divisions of the Institute of Physics (IoP) collectively produced approximately 650 publications for the WZI division, 950 for ITFA, and up to 750 for IHEF. During this period, WZI maintained a commendable Field-Weighted Citation Impact (FWCI) of 1.42, surpassing the world average by forty-two percent. ITFA, on the other hand, exhibited a FWCI nearly double the world average, while IHEF showcased a remarkable FWCI of 4.74, marking a staggering four and three-quarters times the world average. Notably, the exceptionally high FWCI of IHEF can be attributed in part to select publications with notably high FWCI values, as evidenced by the significant standard deviation for IHEF. When adjusted for the number of authors and institutions involved, the fractionized FWCI reveals the lowest values for IHEF and the highest for ITFA. Additionally, WZI's publications are consistently featured in high-impact journals, as evidenced by their CiteScore, even when accounting for the field of the journals (SNIP).

Table 4) Number of co-authored publications by IoP divisions

	WZI	*ITFA*	*IHEF*
WZI	-	57	-
ITFA	57	-	42
IHEF	-	42	-

WZI : Van der Waals-Zeeman Institute
ITFA : Institute for Theoretical Physics Amsterdam
IHEF : Institute for High Energy Physics

IoP Core Area

The Core Area benchmark approach aims to strike a balance between representing the major focus areas of an institute while avoiding including too many sub-niches resulting from accidental collaborations or new lines of investigation. For IoP, the approach involved selecting the 25 largest Topics, each consisting of 15 or more publications. Together, these Top-25 Topics make up the IoP Core Area, which comprises 47.7% (1091 of 2283) of the total IoP publication set from 2017 to 2022. A list of these Top-25 Topics can be found in Table 5. See App.2 for an overview of these (in green shade) and the next largest IoP Topics.

Table 5) Topics in IoP CA, FWCI, Prominence percentile, number of pubs in the world and UvA 2017-2022

TOPIC NAME	TOPIC NUMBER	#_PUBS_WORLD	FWCI	PROMINENCE PERCENTILE	#_PUBS_UVA
BLACK HOLES; HAWKING RADIATION; CORRELATOR	23945	1259	1,71	97,34	22
BOSON; PARTONS; HIGGS BOSONS	1026	3602	1,54	99,66	375
CONFORMAL FIELD THEORY; BOOTSTRAP; POINT	18444	903	1,86	96,68	17
COSMOS; DARK MATTER; ANTIPROTONS	421	1841	1,23	96,49	40
DARK MATTER; HIGGS; SCALAR	14888	690	1,23	91,84	23
GRANULAR MATERIALS; JAMMING; FRICTION	4658	901	0,80	94,21	29
GRAVITATION; ADS/CFT; HOLOGRAPHY	1362	1554	0,96	96,79	20
GRAVITATION; ENTANGLEMENT; ADS/CFT CORRESPONDENCE	5456	2395	1,71	99,07	63
GRAVITATIONAL WAVES; LIGO (OBSERVATORY); COMPACT	3496	1937	2,65	99,39	33
GRAVITATIONAL WAVES; LIGO (OBSERVATORY); NEUTRON STARS	20250	421	1,67	96,28	29
INFLATION; SUPERGRAVITY; COSMOS	693	1697	1,36	97,62	18
IONIC COLLISIONS; RELATIVISTIC HEAVY-ION COLLISIONS; HEAVY ION	633	2120	0,98	98,01	15
MATRIX PRODUCT; STATISTICAL MECHANICS; QUANTUM SPIN CHAIN	11569	1148	1,36	96,83	28
MOLECULAR DYNAMICS; VIBRATIONAL SPECTRA; HETERODYNE	2343	1040	0,95	97,09	16
NEUTRINOS; COSMIC RAY; ASTROPHYSICS	2428	1533	1,11	96,66	64
NEUTRON STARS; MERGERS; GRAVITATIONAL WAVES	8569	2731	2,39	99,51	33
PEROVSKITE SOLAR CELLS; SOLAR CELL; FORMAMIDINE	20	35047	2,11	100,00	19
QUANTUM OPTICS; THERMALIZATION (ENERGY ABSORPTION); EIGENVALUES AND EIGENFUNCTIONS	10102	2871	1,97	99,34	68
RYDBERG STATES; ATOM; QUANTUM NUMBERS	8120	1189	1,23	97,42	15
SILICON; NANOCRYSTAL; PHOTOLUMINESCENCE	9074	679	0,69	91,41	19
SUBSTRUCTURE; GLUONS; TOP QUARK	16091	705	1,72	95,06	31
TOPOLOGICAL INSULATORS; BISMUTH SELENIDE; TOPOLOGY	779	3974	0,97	99,43	16
TRAPPED IONS; QUANTUM OPTICS; ION TRAPS (INSTRUMENTATION)	4684	1156	1,05	96,82	19
WEAKLY INTERACTING MASSIVE PARTICLES; DETECTOR; DEMAND ASSIGNMENT MULTIPLE ACCESS	839	1803	1,39	97,98	59
WEYL; METALLOIDS; PAUL ADRIEN MAURICE DIRAC	10067	4920	1,44	99,70	20

Figure 1: IoP divisions distribution over 25 IoP Core Area topics 2017-2022

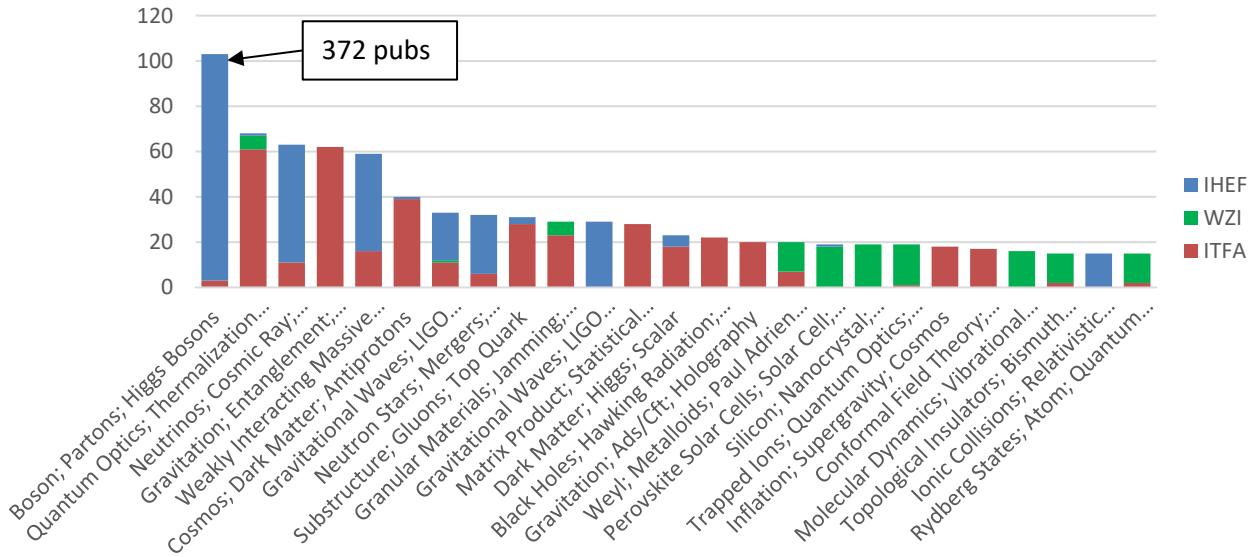


Figure 1 illustrates the 25 distinct topics comprising the IoP core area, along with the number of publications associated with each division. It is important to note that all divisions are integral to the IoP core area.

The bar depicting the topic with the highest number of publications (Boson; Partons; Higgs Bosons, 372 publications) is truncated at one hundred to maintain readability for the remaining bars. Eleven of the twenty five topics consist of one unique division, while fourteen topics consist of a main theme and a smaller additional theme. *These topics have been "polluted" by co-authored publications, as shown in Table 4.*

Part 2. Benchmark global Top-30 and European top 12 Universities in IoP CA

The table on the next page provides the same 15 SciVal metrics as listed in Table 2 for the 30 most active/productive institutions globally in the IoP Core Area. In addition, the scores for three IoP publication (sub)sets are included in the bottom 3 rows of table 6.
The University of Amsterdam (UvA) ranks twenty seventh globally in terms of the number of publications in the IoP core area. In terms of Field Weighted Citation Impact (FWCI), UvA ranks fifteenth. UvA's papers have a tendency to be co-authored by fewer researchers, resulting in the university ranking twelfth in the author fractional FWCI score (FWCI/aut).
The UvA ranks 30th in topic prominence, among the top 30 institutions. However, despite publishing in less impactful topics, UvA ranks high (fifteenth in top 30 and 364% higher than the world average) in Field Weighted Citation Impact.
It's worth noting that the UvA set includes 101 papers not co-authored by IoP, which is why the bottom three rows have been added to Table 6. These rows show the metrics for all IoP papers within and outside its Core Area, as well as for its total publication set.
If we only consider the 1091 Core Area papers of IoP, it would rank 40th among universities globally. However, for most universities, inclusion of papers from other units outside their physics departments is inevitable. Therefore, it seems fairer to use an international benchmark at the university level rather than at the department level.
From the two IoP publication (sub)sets added in the bottom rows of the first table, we can infer amongst other things that:
• In the IoP Core Area, IoP CA compares similar to UvA in terms of FWCI and in both fractional FWCI metrics.
• IoP CA compares favourably to the complete publication set of IoP (IoP_all) in terms of FWCI but unfavourable in terms of the two fractional FWCI metrics. This can be explained by the high number of authors and institutions (kilo-authored papers) for several topics in the the IoP Core Area

Table 6) SciVal metrics for top 30 institutions in IoP core area (2017-2022)

	#P	%P	#C	%C	QS (2024)	FWCI	sd FWCI	FWtop%	Avg. # auth	FWCI/aut	Avg. # inst	FWCI/inst	Top Prom	CiteSc	SNIP	views/p
UoCAS	2905	6,1%	106747	4,2%	-	2,53	5,93	27,44	499,20	0,26	52,43	0,41	99,22	11,90	1,55	77,95
Peking	2231	4,7%	90563	3,6%	17	2,66	4,44	25,10	569,48	0,24	61,56	0,54	99,41	13,29	1,69	91,84
Saclay	2142	4,5%	111322	4,4%	71	3,56	9,96	23,46	1125,92	0,22	118,61	0,15	98,58	8,89	1,37	149,77
Tokyo	2107	4,5%	104772	4,2%	28	3,20	9,84	28,14	680,02	0,29	71,92	0,39	98,53	9,72	1,44	99,76
MIT	1942	4,1%	122838	4,9%	1	3,95	10,80	23,09	624,18	0,38	72,28	0,56	98,50	11,68	1,70	101,21
Tsinghua	1780	3,8%	102853	4,1%	25	3,69	10,27	22,15	1153,20	0,16	115,00	0,40	99,19	11,16	1,60	154,50
UoSaToC	1715	3,6%	58689	2,3%	137	2,36	3,32	27,53	718,85	0,17	68,97	0,35	99,11	10,78	1,50	97,78
UoCatBerk	1678	3,6%	97387	3,9%	10	3,74	7,99	21,79	815,06	0,36	84,17	0,40	98,60	11,37	1,68	107,69
Oxford	1627	3,4%	87955	3,5%	3	3,50	7,74	23,17	777,07	0,47	76,58	0,78	98,86	11,99	1,67	106,35
Paris	1610	3,4%	93137	3,7%	236	3,76	11,38	25,93	890,40	0,22	96,38	0,14	98,23	8,59	1,33	122,53
Sapienza	1574	3,3%	95644	3,8%	134	4,03	11,40	21,64	1510,56	0,10	154,94	0,13	98,85	9,20	1,40	196,49
Stanford	1547	3,3%	108484	4,3%	5	4,27	11,54	21,36	854,99	0,39	86,89	0,56	98,68	11,97	1,70	119,04
Maryland	1534	3,2%	97688	3,9%	169	4,07	11,75	24,05	795,15	0,24	92,10	0,35	98,41	10,20	1,56	117,14
Moscow	1484	3,1%	81934	3,3%	87	3,73	11,18	24,80	1583,39	0,04	159,60	0,09	98,89	8,51	1,29	213,14
CAL_it	1465	3,1%	98523	3,9%	15	4,43	11,92	18,91	777,23	0,46	88,07	0,55	98,72	10,70	1,58	115,82
Nanjing	1448	3,1%	56527	2,2%	141	2,54	4,88	27,30	813,29	0,17	74,95	0,51	99,41	10,97	1,53	109,74
Cambridge	1437	3,0%	106064	4,2%	2	4,64	12,34	19,91	913,70	0,35	90,28	0,58	99,17	13,78	1,82	129,82
Mosc_epi	1394	3,0%	52796	2,1%	-	2,85	5,43	25,75	1636,09	0,06	162,86	0,08	98,74	7,77	1,23	203,28
Wisconsin	1376	2,9%	61904	2,5%	102	3,24	6,00	22,94	1625,96	0,10	161,30	0,19	98,70	9,01	1,35	196,50
Princeton	1369	2,9%	70517	2,8%	17	3,46	5,47	20,69	739,47	0,51	79,93	0,76	99,00	12,71	1,82	109,33
Napels	1352	2,9%	85203	3,4%	335	4,27	11,71	20,51	1715,01	0,07	173,99	0,09	98,87	9,51	1,37	219,47
Sorbonne	1351	2,9%	90734	3,6%	59	4,20	12,11	22,74	988,62	0,30	101,42	0,19	98,60	9,73	1,46	133,19
U_aut_Madrid	1332	2,8%	57858	2,3%	199	3,16	5,52	20,66	1651,11	0,14	162,85	0,11	98,86	9,60	1,40	202,36
Ohio	1309	2,8%	61683	2,5%	151	3,35	5,69	19,48	1755,18	0,09	174,90	0,17	98,86	9,60	1,43	212,76
Pisa	1296	2,7%	83759	3,3%	349	4,38	12,22	19,40	1789,81	0,07	180,89	0,09	98,89	8,92	1,34	225,93
Harvard	1265	2,7%	71994	2,9%	4	3,59	6,34	21,65	968,55	0,48	93,53	0,60	98,56	11,15	1,67	120,27
UvA	1251	2,6%	64863	2,6%	53	3,64	8,49	22,83	1032,57	0,28	103,70	0,33	98,17	9,09	1,36	130,49
Kyoto	1247	2,6%	48026	1,9%	46	2,73	4,69	24,74	984,93	0,31	94,75	0,42	98,83	9,03	1,33	126,72
Bologna	1238	2,6%	57871	2,3%	154	3,40	6,23	20,57	1806,81	0,06	179,08	0,08	98,88	8,96	1,35	222,16
Genoa	1237	2,6%	85657	3,4%	530	4,59	12,38	18,44	1871,46	0,09	187,79	0,15	99,06	9,65	1,41	236,28
IoP_all	2283		87065			2,71	5,92	26,19	653,03	0,32	66,25	0,43	93,67	10,09	1,55	91,33
IoP_other	1192		32340			1,85	2,88	31,30	216,84	0,34	25,85	0,48	89,50	10,46	1,64	46,99
IoP_CA	1091		54725			3,65	7,92	20,59	1129,60	0,29	110,38	0,37	98,15	9,70	1,45	139,78

An interactive version of this table, in which the results can be sorted by each indicator (column), can be found here.

Table 7) Ranked SciVal metrics for top 12 European institutions in IoP core area (2017-2022)

	#P	%P	#C	%C	FWCI	sd FWCI	FW top%	Nr Auth	FWCI/ aut	Nr Inst	FWCI/ inst	Top Prom	CiteSc	SNIP	views/
Saclay	1	1	1	1	9	8	2	7	5	7	5	10	11	8	7
Oxford	2	2	6	6	10	10	3	12	1	12	1	6	2	2	12
Paris	3	3	4	4	7	7	1	11	6	10	7	11	12	12	11
Sapienza	4	4	3	3	6	6	6	6	8	6	8	8	7	6	6
Cambridge	5	5	2	2	1	2	10	10	2	11	2	1	1	1	10
Napels	6	6	8	8	4	5	9	4	11	4	10	5	6	7	4
Sorbonne	7	7	5	5	5	4	5	9	3	9	4	9	3	3	8
U_aut_Madrid	8	8	12	12	12	12	7	5	7	5	9	7	5	5	5
Pisa	9	9	9	9	3	3	11	3	10	2	11	3	10	11	2
UvA	10	10	10	10	8	9	4	8	4	8	3	12	8	9	9
Bologna	11	11	11	11	11	11	8	2	12	3	12	4	9	10	3
Genoa	12	12	7	7	2	1	12	1	9	1	6	2	4	4	1

Table 7 shows the top 12 IoP Core Area institutions in Europe. UvA ranks 10th in number of publications. In the top 12 UvA ranks 8th in FWCI (3.64). FWCI corrected for number of authors and number of institutes (FWCI/aut and FWCI/inst) UvA ranks fourth and third respectively. See “DORA-proof sophistication” for justification of the two FWCI derivatives.

‘DORA-proof’ sophistication

An important recommendation, bothfrom DORA and in the Leiden Manifesto, is to use a wide array of article-level metrics and to take into account differences between fields and in publication culture. Average FWCI is derived from article-level metrics and normalised for differences between output types (e.g., journal articles, reviews, conference proceedings, book chapters) and between papers from different fields and publication years. However, they do not normalise for differences in publication culture within fields, e.g., as reflected in number of co-authors. That is why we included co-author count and the number of affiliations involved in the SciVal export of publication sets to Excel, allowing closer inspection and further refinement of citation metrics. See App.3 for these checks and refinements.

Table 8) acronym, full institution name and country

ACRONYM	FULL INSTITUTION NAME	COUNTRY CODE
UOCAS	University of Chinese Academy of Sciences	CHN
PEKING	Peking University	CHN
SACLAY	Université Paris-Saclay	FRA
TOKYO	The University of Tokyo	JPN
MIT	Massachusetts Institute of Technology	USA
TSINGHUA	Tsinghua University	CHN
UOSATOC	University of Science and Technology of China	CHN
UOCATBERK	University of California at Berkeley	USA
OXFORD	University of Oxford	GBR
PARIS	Université Paris Cité	FRA
SAPIENZA	University of Rome La Sapienza	ITA
STANFORD	Stanford University	USA
MARYLAND	University of Maryland, College Park	USA
MOSCOW	Lomonosov Moscow State University	RUS
CAL_IT	California Institute of Technology	USA
NANJING	Nanjing University	CHN
CAMBRIDGE	University of Cambridge	GBR
MOSC_EPI	Moscow Engineering Physics Institute	RUS
WISCONSIN	University of Wisconsin-Madison	USA
PRINCETON	Princeton University	USA
NAPELS	University of Naples Federico II	ITA
SORBONNE	Sorbonne Université	FRA
U_AUT_MADRID	Universidad Autónoma de Madrid	ESP
OHIO	Ohio State University	USA
PISA	University of Pisa	ITA
HARVARD	Harvard University	USA
UVA	University of Amsterdam	NLD
KYOTO	Kyoto University	JPN
BOLOGNA	University of Bologna	ITA
GENOA	University of Genoa	ITA

Part 3. 1996-2022 trends in IoP Core Area

Figure 2) Scopus (global) publications and FWCI for IoP core area (1996-2022)

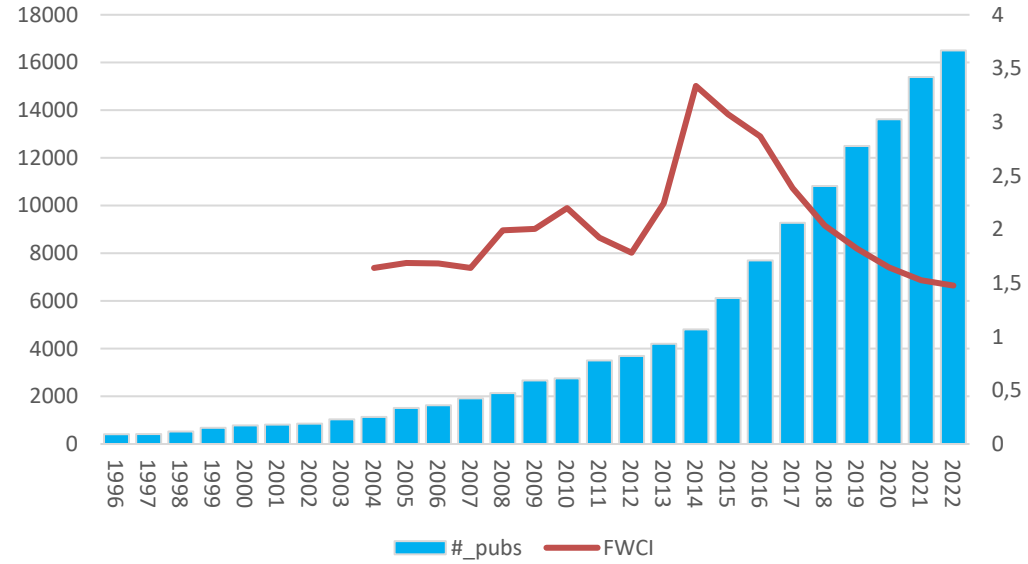


Figure 2 shows for the period 1996-2022 upto that it can be divided in three periods: the number of publications rises from 1996 to 2012 steadily and grows exponential from 2012 upto around 2019 and from 2020 onwards still rising but not as hard as before. The FWCI is from 1996 upto 2004 skewed because of the small amount of publications and large outliers. From 2004 to 2022 the FWCI first climbs from 1.5 to more than 3 in 2014 and subsequently declines to 1.5 again in 2022.

To analyze trends over time in the IoP Core Area, various methods were used including plotting annual averages in #P and FWCI from 1996-2022 in Figure 2, ranking universities based on the number of publications per year in the IoP Core Area in Table 9, tracking FWCI for the period 1996-2022 for UvA, Oxford and UoCAS in Figure 3, exploring UvA's collaboration with top core area institutions through co-authorship in Table 10, and examining production (= number of publications) in the 25 topics of the IoP Core Area over time in the next four pages.

Based on these analyses, the following observations can be made:

Table 9) number of publications of top 35 universities in IoP core area (1996-2023)

	UOCAS	PEKING	SACLAY	TOKYO	MIT	TSINGHUA	UOSATOC	UOCATBERK	OXFORD	PARIS	SAPIENZA	STANFORD	MARYLAND	MOSCOW	CAL_IT	NANJING	CAMBRIDGE	MOSC_EPI	WISCONSIN	PRINCETON	NAPELS	SORBONNE	U_AUT_MADRID	OHIO	PISA	HARVARD	UVA	KYOTO	BOLOGNA	GENOA
2006	7	1	12	32	59	11	3	43	24	11	34	35	49	23	48	1	18	4	32	16	9	19	6	17	12	9	11	24	12	5
2007	6	6	15	55	51	6	7	33	35	12	33	36	67	31	41	1	16	10	49	20	22	26	11	31	30	16	16	24	16	10
2008	11	8	27	64	83	14	18	45	41	17	39	59	60	32	56	5	23	9	44	48	23	46	13	34	24	28	18	26	11	3
2009	15	15	36	97	79	11	11	70	47	36	34	69	87	39	67	7	28	26	50	53	37	40	13	49	32	33	17	38	15	5
2010	12	22	42	85	80	25	27	61	51	36	42	82	83	29	70	17	30	18	36	66	35	41	16	48	41	39	34	37	22	11
2011	7	46	59	116	120	35	45	70	73	63	89	68	114	86	108	33	60	52	99	82	75	71	58	90	87	75	48	70	68	29
2012	15	52	92	119	142	54	64	109	96	71	105	105	112	94	121	50	91	50	92	89	77	94	73	103	90	92	71	93	78	45
2013	20	64	84	137	162	62	67	116	108	64	102	98	120	118	136	57	85	85	130	96	110	104	86	106	95	86	85	91	102	75
2014	24	90	87	147	169	74	66	126	161	82	118	114	107	104	122	59	110	58	108	111	95	113	87	96	110	92	94	98	95	86
2015	47	138	129	197	241	128	100	174	210	109	156	154	164	146	127	99	144	139	155	149	130	121	122	152	134	108	122	137	140	114
2016	83	176	206	247	239	188	141	209	235	161	209	227	201	201	150	164	177	200	164	184	175	178	147	183	173	158	163	170	185	168
2017	184	257	266	302	268	229	181	220	274	197	240	240	257	267	214	207	193	241	231	213	222	207	184	209	223	172	187	182	200	217
2018	375	305	329	339	300	325	258	247	280	141	297	239	243	276	233	279	202	257	260	252	237	202	231	248	257	190	184	240	265	237
2019	497	323	327	323	334	331	262	269	235	124	281	192	252	275	251	261	228	240	242	242	233	201	205	234	230	171	223	207	218	233
2020	534	307	276	369	268	291	272	300	242	160	223	189	215	215	229	221	227	213	197	231	204	215	184	200	173	167	209	173	177	173
2021	634	382	305	352	307	300	302	281	277	202	235	168	234	243	246	257	262	217	228	224	215	224	184	193	199	175	222	204	181	195
2022	662	388	314	420	370	295	328	314	307	192	217	166	316	208	216	219	217	226	218	207	240	208	147	225	214	222	222	216	197	182
2023	736	410	313	322	230	331	420	263	292	181	207	184	176	89	194	270	235	63	205	196	214	238	196	215	196	233	202	197	203	174

The overall production in the IoP Core Area (CA) exhibits an almost exponential rise during the period 1996-2023 (See Figure 2). The heatmap, which represents the 35 largest institutes globally in the IoP CA as depicted in Table 9, vividly illustrates the remarkable ascent of Chinese universities. Initially, Chinese institutions were almost absent from the top 35; however, they gradually climbed the ranks and ultimately became some of the most prolific contributors by the end of the study period.

Notably, the University of Amsterdam (UvA) began its publications within the IoP Core Area in 2000, marking its entry into this domain, and has maintained a stable publication rate of around 200 publications per year since 2017. Conversely, Stanford University appears to have shifted its focus away from the IoP CA over time, possibly reflecting changes in research priorities or strategic directions.

It is noteworthy that the two institutes from Moscow show a sharp decline in publication output within the IoP CA in 2023.

Figure 3) FWCI for UoCAS and UvA 2005-2021

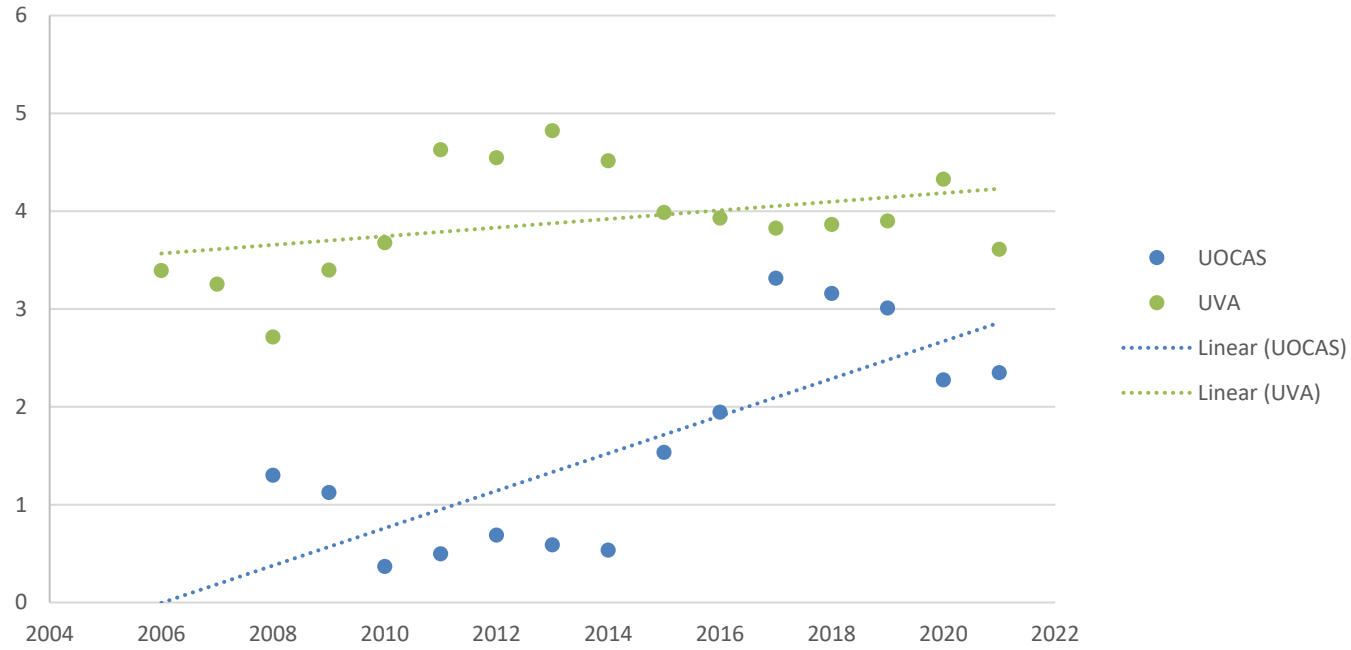


Figure 3 depicts the average Field-Weighted Citation Impact (FWCI) per year for the University of Chinese Academy of Sciences (UoCAS) and the University of Amsterdam (UvA) within the IoP CA. Years with fewer than 15 publications (prior to 2005) have been excluded.

Both institutions demonstrate a notable increase in FWCI over the years. UoCAS exhibits a FWCI ranging between 0.5 and 1.5 during the first decade (2005-2015). Subsequently, from 2017 to 2019, UoCAS's FWCI surged to approximately 3, while in the most recent three years, it stabilized around 2.

Similarly, UvA also shows a rising FWCI within the IoP CA, albeit with a less steep trajectory compared to UoCAS. In terms of absolute FWCI, UvA surpasses UoCAS.

Table 10) UvA collaboration heat map - top core area institutions (2011-2023)

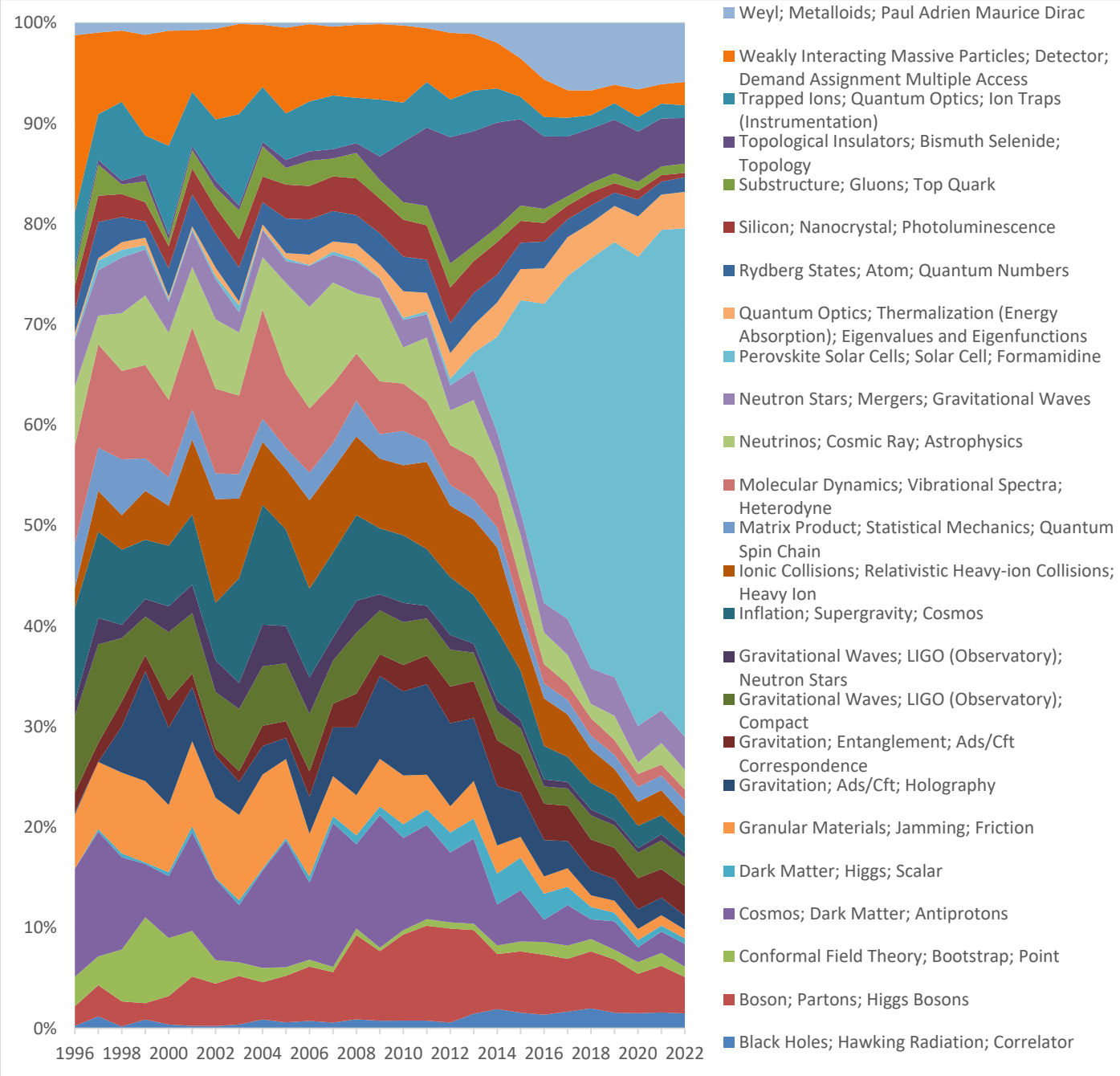
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
FOM-Institute of Subatomic Physics – NIKHEF	32	44	48	46	66	94	102	115	127	106	122	116	126
CNRS Centre National de la Recherche Scientifique	31	40	39	45	63	89	105	116	117	107	111	121	116
IN2P3 - Institut National de Physique Nucléaire et de Physique Des Particules	30	40	39	43	59	86	97	112	107	91	95	112	108
Istituto Nazionale di Fisica Nucleare – INFN	27	40	39	42	57	83	93	108	105	86	90	100	106
Université Paris-Saclay	30	40	38	39	55	77	87	108	108	84	97	89	102
Istituto Nazionale di Fisica Nucleare, Sezione di Napoli	20	33	33	38	54	78	84	104	108	85	92	104	104
Università degli Studi di Napoli Federico II	20	32	34	38	54	78	84	104	108	85	91	102	104
Sorbonne Université	28	40	34	37	53	73	87	106	106	79	91	73	100
Sapienza Università di Roma	27	38	34	39	55	79	85	105	100	82	88	89	99
Istituto Nazionale di Fisica Nucleare, Sezione di Bologna	27	41	42	39	57	80	95	108	91	73	77	81	104
Università degli Studi di Genova	27	38	39	39	54	78	84	104	98	79	86	87	96
Università di Pisa	27	38	40	37	52	81	95	107	99	78	81	74	95
Istituto Nazionale di Fisica Nucleare, Sezione di Genova	26	40	38	39	53	78	83	104	99	79	86	87	100
Alma Mater Studiorum Università di Bologna	27	41	42	40	57	82	94	109	88	72	70	82	104
Aix Marseille Université	30	39	39	38	55	78	84	107	81	71	73	88	98
Institut de Recherche sur les Lois Fondamentales de l'Univers	30	39	39	40	56	79	87	108	98	81	77	68	94
Centre de Physique des Particules de Marseille	30	39	39	38	55	78	84	107	81	72	73	86	98
Columbia University	23	35	35	38	55	72	87	102	103	74	85	72	101
The University of Tokyo	20	32	33	35	54	72	76	103	102	88	95	78	102
Université Paris Cité	25	34	36	38	55	80	96	73	46	88	99	107	100
Istituto Nazionale di Fisica Nucleare, Sezione di Pisa	27	41	39	36	51	77	89	107	99	79	80	58	93
CSIC-UV - Instituto de Física Corpuscular	27	40	40	40	58	82	84	106	81	69	72	77	99
Commissariat a l'Energie Atomique et aux Energies Alternatives	27	35	35	35	52	80	85	95	98	81	80	72	94
The University of Chicago	20	32	32	34	54	70	86	105	101	78	81	70	99
Stockholms universitet	23	33	32	38	56	80	90	109	87	74	69	55	97
Consejo Superior de Investigaciones Científicas	24	34	31	40	57	83	86	105	79	56	74	72	94
Julius-Maximilians-Universität Würzburg	20	32	34	38	54	76	83	107	82	69	71	79	98
Radboud Universiteit	23	32	31	34	53	71	75	100	99	75	82	57	91
University of Washington	23	33	32	35	53	69	75	99	94	71	80	60	93
Université Grenoble Alpes	23	31	31	35	53	67	75	104	95	73	81	57	91
Laboratoire de Physique de Clermont	29	37	36	37	55	75	83	103	79	65	67	55	94
Université Mohammed Premier Oujda	20	34	36	37	53	74	83	104	81	69	68	72	97
Université Savoie Mont Blanc	20	33	31	38	53	71	78	102	94	70	81	63	92
Oskar Klein Centre	20	32	32	38	54	75	91	109	87	70	69	52	97
University of Birmingham	20	33	32	34	51	70	78	99	99	75	79	57	96
University of Michigan, Ann Arbor	23	33	32	34	51	70	75	100	94	69	78	53	92
Johannes Gutenberg-Universität Mainz	23	34	34	36	56	73	85	105	84	66	66	47	98
Laboratoire de Physique Nucléaire et de Hautes Energies	24	32	32	35	52	70	84	106	82	65	68	55	97
Université Clermont Auvergne	26	38	37	37	54	73	83	103	79	65	68	55	92
University of Cambridge	20	32	32	35	52	69	77	99	96	72	79	55	98

The University of Amsterdam's (UvA) collaboration heat map indicates that it engages in partnerships with only a subset of the most active universities within the IoP Core Area, as illustrated in Table 6. Table 10 further demonstrates that among the top 40 institutes UvA collaborates with, all but four are European

universities. This European emphasis underscores the importance of comparing UvA's performance within the IoP Core Area globally (Table 6) alongside a specific focus on its European counterparts (Table 7).
Some of the institutions listed in Table 10 are not directly represented in Table 6 due to their nature as (inter-) national collaborations, comprising individual universities already present in Table 6. Additionally, certain institutions in Table 10 are not included in Table 6 due to their lower production within the IoP Core Area, despite their significant collaboration with the University of Amsterdam (UvA).

Collaboration between UvA and others increases gradually during the years analysed. 2018 is together with 2023 a highly cooperative year. 2019 upto 2022 is for the largest part of the collaboration a calmer period (in sense of collaboration).
Three institutions show a different collaboration pattern. FOM and CNRS are present in half or more of the collaborations of the UvA in the IoP CA and do not show a ‘dip’ in the years between 2019 and 2023. Universite Paris Cite and UvA have a unique collaboration compared to the others in the collaboration top 40.

Figure 4) relative contribution of all publications for IoP core area topics (1996-2023)



The IoP Core Area consists of 25 topics. Figure 4 shows the global relative presence. This global presence is based on the publications in Scopus. Most striking is the light blue color of topic “Perovskite Solar Cells; Solar Cell; Formamidine”, growing in ten years from less than 5% in 2012 to more than 50% in 2022.
The other topics appear to be more or less constant in mutual ratio during the years 2017-2022.
Topic “Weyl; Metalloids, …)” starts to grow compared to other topics since 2014. Topic “Topological Insulators; …” starts to grow from 2009 and “Black Holes; ….” from 2012.

Summary

- The University of Amsterdam (UvA) ranks 10th among European academic institutions in terms of the number of publications in the IoP Core Area.
- Globally, the University of Amsterdam (UvA) holds the 27th position among academic institutions for the number of publications in the IoP Core Area.
- UvA is positioned 15th globally and 8th in Europe based on Field Weighted Citation Impact (FWCI) within the top 30 and top 12 institutions, respectively, in the IoP Core Area.
- UvA's publications typically involve fewer co-authors and collaborations with other institutions, significantly affecting the university's ranking for both fractional FWCI scores within the top 12 European institutions in the IoP Core Area. It ranks fourth for FWCI per authors and third for FWCI per institutions within the European top 12.
- The IoP Core Area has witnessed a remarkable surge in activity, with the number of publications increasing exponentially from 385 in 1996 to 14,209 in 2022.
- The global average FWCI in the IoP Core Area has fluctuated from 1.7 in 2004 to a peak of 3.3 in 2014, before decreasing to around 1.5 in 2022. In contrast, UvA has demonstrated a gradual increase in FWCI during the same period, rising from just above 3 to 3.5, indicating an impact three times higher than the global average in 2004 and three and a half times higher in 2022.
- UvA primarily collaborates with European universities in the IoP Core Area for its publications.

Appendix 1. Definition SciVal metrics

By uploading DOIs from the own CRIS to SciVal and subsequent export from SciVal to Excel, the following main metrics can be obtained for each single publication:
1. C: total citation count since publication (in Scopus)
2. FWCI: Field-Weighted Citation Impact: the number of citations received by a publication in the first three years after publication, divided by the global average number of citations received in the same time window by all similar publications, i.e. publications from the same year, publication type (Article, Review, Conference paper, etc.), and ASJC subcategory[6] . An FWCI of 2 reflects a two times higher citation impact than the global average for a similar publication.
3. #Auth: number of co-authors: used to calculate an adjusted FWCI:
4. FWCI/Auth: corresponds to an alternative raw citation count and normalised impact indicator, based on what is known as author-level fractional counting.
5. #Inst: number of distinct institutes among the list of co-authors: used to calculate another adjusted FWCI:
6. FWCI/Inst: provide yet two other alternative fractional indicators, based on organization-level fractional counting.
7. Topic Promin: a 'Prominence percentile', i.e. a proxy for a Topic's 'momentum/movement or visibility' (the higher the percentile, the more prominent). It is calculated from three other SciVal metrics: citation count in year n to papers published in n and n-1, Scopus views count in year n to papers published in n and n-1, and average CiteScore (~ journal impact) for year n[7] .
8. CiteScore and SNIP: Elsevier equivalents of Clarivate's Journal Impact Factor. The Source Normalized Impact per Paper (SNIP) accounts for differences between ASJC subcategories, making it better comparable between disciplines. Absolute values of CiteScore vs JIF are not comparable but highly correlated. Note that these journal-based metrics are no longer accepted in the SEP as proxies for article-based metrics

For sets of n publications, we will calculate aggregated metrics by simply averaging the article-level metrics: CPP = ∑C/n, avgFWCI = ∑FWCI/n, etc.
When pooling m subsets, we will use weighted averaging, e.g.:

$$\textbf{avgFWCI} = \frac{(n_1 \times FWCI_1 + ... + n_m \times FWCI_m)}{(n_1 + ... + n_m)}$$

Note, however, that averages, weighted or not, can be biased due to the highly skewed distribution of citations over publications. Therefore, we prefer to plot frequency distributions over FWCI intervals, allowing outlier inspection, and include standard deviations when reporting averages.

Elsevier has classified all its Scopus sources (Journals, Conference proceedings, Books. etc.) following its own All Science Journal Classification scheme, comprising 334 journal sets, grouped in 27 broad areas. A single journal can be assigned to up to 13 ASJC codes, depending on the diversity of targeted (sub-disciplines). The most general journals (such as Nature, Science, PlosONE, PNAS) are assigned one ASJC label only: Multidisciplinary. Hence, these are not included in the other ASJC subcategories or areas. 7 See this web page for a detailed explanation: https://www.elsevier.com/solutions/scival/releases/topic-prominence-in-science 8 The Dutch Strategy Evaluatio Protocol refrs to the San Francisco Declaration On Research Assessment (DORA). 9 See Adams, J., McVeigh, M., Pendlebury, D. & Szomszor, M. (2019). Profiles, not metrics. ISI Global Research Report, Clarivate. https://clarivate.com/webofsciencegroup/campaigns/profiles-not-metrics/ App.1 to SciVal benchmark HI Psychology RISe 22 February 2023 2 All FWCI scores reported will be based on citation counts including self-citations10 and all document types. Fractional indicators 5 and 7 allow a fairer comparison of sub-disciplines with strong differences in publication culture. In particular, consortium papers with very large co-author counts ('kilopapers'), tend to represent outliers with extremely high citation counts, causing bias in average FWCI scores11. If desired / necessary, we can provide separate metrics for two fractions of a publication set: papers co-authored by no more than n vs. those with >n co-authors, where n represents the modus or median in the distribution of papers over #Co-authors / paper intervals. Rather than choosing between alternative citation impact indicators, we prefer to report all eight alternative metrics, following the DORA and Leiden Manifesto recommendation to use a wide array of metrics for responsible analyses.

Appendix 2. IoP topics 2017-2022

TOPIC_NAME	#P	C_AVG	FWCI_AVG	#AUTH_AVG	VIEWS_AVG	#INST_AVG
BLACK HOLES; HAWKING RADIATION; CORRELATOR	1259	21,97	1,71	2,64	11,07	2,42
BOSON; PARTONS; HIGGS BOSONS	3602	17,58	1,54	575,93	75,62	57,35
CONFORMAL FIELD THEORY; BOOTSTRAP; POINT	903	23,15	1,86	2,62	9,09	2,41
COSMOS; DARK MATTER; ANTIPROTONS	1841	11,22	1,23	19,82	23,53	6,43
DARK MATTER; HIGGS; SCALAR	690	17,81	1,23	32,92	19,52	6,20
GRANULAR MATERIALS; JAMMING; FRICTION	901	10,09	0,80	3,49	17,79	2,51
GRAVITATION; ADS/CFT; HOLOGRAPHY	1554	12,58	0,96	2,83	12,73	2,57
GRAVITATION; ENTANGLEMENT; ADS/CFT CORRESPONDENCE	2395	18,81	1,71	2,67	11,64	2,42
GRAVITATIONAL WAVES; LIGO (OBSERVATORY); COMPACT	1937	35,50	2,65	18,46	16,20	5,61
GRAVITATIONAL WAVES; LIGO (OBSERVATORY); NEUTRON STARS	421	22,03	1,67	142,92	35,25	23,73
INFLATION; SUPERGRAVITY; COSMOS	1697	17,73	1,36	2,96	12,01	2,83
IONIC COLLISIONS; RELATIVISTIC HEAVY-ION COLLISIONS; HEAVY ION	2120	11,71	0,98	78,53	22,10	11,22
MATRIX PRODUCT; STATISTICAL MECHANICS; QUANTUM SPIN CHAIN	1148	18,64	1,36	3,35	12,72	2,65
MOLECULAR DYNAMICS; VIBRATIONAL SPECTRA; HETERODYNE	1040	15,16	0,95	4,61	21,47	2,28
NEUTRINOS; COSMIC RAY; ASTROPHYSICS	1533	10,48	1,11	53,99	16,03	11,96
NEUTRON STARS; MERGERS; GRAVITATIONAL WAVES	2731	36,79	2,39	22,00	19,63	7,52
PEROVSKITE SOLAR CELLS; SOLAR CELL; FORMAMIDINE	35047	36,13	2,11	6,91	31,72	2,49
QUANTUM OPTICS; THERMALIZATION (ENERGY ABSORPTION); EIGENVALUES AND EIGENFUNCTIONS	2871	26,44	1,97	3,43	11,03	2,85
RYDBERG STATES; ATOM; QUANTUM NUMBERS	1189	16,83	1,23	4,78	14,17	2,40
SILICON; NANOCRYSTAL; PHOTOLUMINESCENCE	679	12,07	0,69	5,34	25,31	2,20
SUBSTRUCTURE; GLUONS; TOP QUARK	705	19,86	1,72	10,29	11,94	3,94
TOPOLOGICAL INSULATORS; BISMUTH SELENIDE; TOPOLOGY	3974	15,27	0,97	6,18	20,26	3,11
TRAPPED IONS; QUANTUM OPTICS; ION TRAPS (INSTRUMENTATION)	1156	13,88	1,05	5,35	13,37	2,35
WEAKLY INTERACTING MASSIVE PARTICLES; DETECTOR; DEMAND ASSIGNMENT MULTIPLE ACCESS	1803	16,94	1,39	22,55	17,99	6,66
WEYL; METALLOIDS; PAUL ADRIEN MAURICE DIRAC	4920	23,20	1,44	6,38	20,60	3,39

Appendix 3. Heatmap global top 30 ranked global academic institutions

	UOCAS	PEKING	SACLAY	TOKYO	MIT	TSINGHUA	UOSATOC	UOCATBERK	OXFORD	PARIS	SAPIENZA	STANFORD	MARYLAND	MOSCOW	CAL_IT	NANJING	CAMBRIDGE	MOSC_EPI	WISCONSIN	PRINCETON	NAPELS	SORBONNE	U_AUT_MADRID	OHIO	PISA	HARVARD	UVA	KYOTO	BOLOGNA	GENOA
1996			7	2	9		23	5	1	9	6	2	15	15	4		9	18	8	9	15	23		18	18	9		9	18	18
1997			15	2	9	19	19	1	9		5	8	7	11	5		13	11	15	15	4	19			19	13		3	19	15
1998			16	2	11	20		1	3		8	11	16	8	3		8	16	3	3	14	20		16	20	11		3	15	
1999			17	9	2		20	1	9		3	6	12	4	4		12		6	14	9	14	19			6		14	17	
2000		24	16	2	5		19	3	4	21	5	7	10	9	1		10		16	10	23	10	19	16	21	10	24	8	15	
2001		26	11	1	7		23	3	11	23	9	18	4	10	1	26	4	14	11	14	19	8	23	6	19	19	22	14	17	
2002	26	26	13	2	3	24	24	4	6		5	17	1	13	6		6	17	10	15	12	21	21	9	19	19	26	11	15	21
2003	24		16	2	1		25	5	2	25	7	9	6	17	4		7	20	9	14	15	12	20	13	23	18	20	9	18	25
2004	22	28	16	6	3	25	25	3	7	22	11	5	2	17	1	28	9	19	8	14	10	18	25	12	21	15	22	12	19	
2005	21	29	14	3	4	18	24	7	8	21	12	9	1	5	2		12	26	5	17	15	20	26	11	24	21	18	10	16	28
2006	24	29	16	7	1	19	28	4	9	19	6	5	2	11	3	29	13	27	7	15	22	12	25	14	16	22	19	9	16	26
2007	27	27	21	2	3	27	26	8	7	22	8	6	1	10	5	30	17	24	4	16	15	13	23	10	12	17	17	14	17	24
2008	25	28	15	2	1	23	20	8	10	22	11	4	3	13	5	29	18	27	9	6	18	7	24	12	17	14	20	16	25	30
2009	23	23	15	1	3	27	27	4	10	15	17	5	2	12	6	29	20	21	8	7	14	11	26	9	19	18	22	13	23	30
2010	29	24	10	1	4	23	22	7	8	16	10	3	2	21	5	27	20	26	16	6	18	12	28	9	12	14	19	15	24	30
2011	30	25	21	2	1	27	26	15	13	19	7	17	3	9	4	28	20	23	5	10	11	14	22	6	8	11	24	15	17	29
2012	30	26	13	3	1	25	24	5	9	22	6	6	4	10	2	27	16	27	13	18	20	10	21	8	17	13	22	12	19	29
2013	30	26	23	2	1	28	25	7	9	26	12	14	5	6	3	29	20	20	4	15	8	11	18	10	16	18	20	17	12	24
2014	30	21	22	3	1	26	27	4	2	25	6	7	13	14	5	28	10	29	12	9	17	8	22	16	10	20	19	15	17	24
2015	30	15	19	3	1	20	28	4	2	26	6	8	5	11	21	29	12	14	7	10	18	24	22	9	17	27	22	16	13	25
2016	30	17	7	1	2	11	29	5	3	25	5	4	8	8	27	22	16	10	22	13	18	15	28	14	19	26	24	20	12	21
2017	26	6	5	1	3	12	29	15	2	23	9	9	6	4	17	20	24	8	11	18	14	20	26	19	13	30	25	28	22	16
2018	1	5	3	2	6	4	13	18	8	30	7	21	19	10	24	9	26	14	12	16	22	26	25	17	14	28	29	20	11	22
2019	1	5	4	5	2	3	10	9	17	30	7	28	12	8	13	11	22	16	14	14	19	27	26	18	21	29	23	25	24	19
2020	1	3	6	2	8	5	7	4	9	30	13	23	15	15	11	14	12	18	22	10	20	15	24	21	26	29	19	26	25	26
2021	1	2	5	3	4	7	6	8	9	23	14	30	15	13	12	11	10	20	16	17	21	17	27	26	24	29	19	22	28	25
2022	1	3	7	2	4	10	5	7	9	27	18	29	6	23	20	16	18	12	17	25	11	23	30	13	22	14	14	20	26	28
2023	1	3	6	5	13	4	2	9	7	26	16	25	27	29	24	8	11	30	17	21	15	10	21	14	21	12	19	20	18	28
	UOCAS	PEKING	SACLAY	TOKYO	MIT	TSINGHUA	UOSATOC	UOCATBERK	OXFORD	PARIS	SAPIENZA	STANFORD	MARYLAND	MOSCOW	CAL_IT	NANJING	CAMBRIDGE	MOSC_EPI	WISCONSIN	PRINCETON	NAPELS	SORBONNE	U_AUT_MADRID	OHIO	PISA	HARVARD	UVA	KYOTO	BOLOGNA	GENOA

Appendix 3. Ranked SciVal metrics for top 30 institutions in IoP CA (2017-2022)

	#P	**%P**	**#C**	**%C**	**FWCI**	SD **FWCI**	FW **TOP%**	**NR AUTH**	FWCI/ **AUT**	**NR INST**	FWCI/ **INST**	**TOP PROM**	**CITESC**	**SNIP**	**VIEWS/ P**
UOCAS	1	1	4	4	29	22	3	30	13	30	11	3	6	12	30
PEKING	2	2	14	14	27	29	7	29	15	29	8	2	2	5	29
SACLAY	3	3	2	2	17	14	11	12	16	11	21	24	27	22	12
TOKYO	4	4	6	6	23	15	1	27	11	27	14	26	16	16	27
MIT	5	5	1	1	10	12	13	28	6	26	5	27	7	3	26
TSINGHUA	6	6	7	7	14	13	17	11	20	12	13	4	9	9	11
UOSATOC	7	7	25	25	30	30	2	26	18	28	16	6	12	14	28
UOCATBERK	8	8	10	10	12	17	18	20	7	22	12	22	8	6	24
OXFORD	9	9	15	15	18	18	12	24	3	24	1	14	4	7	25
PARIS	10	10	12	12	11	10	5	18	17	15	23	29	28	27	17
SAPIENZA	11	11	11	11	9	9	20	10	23	10	24	16	21	20	10
STANFORD	12	12	3	3	6	8	21	19	5	21	6	21	5	4	19
MARYLAND	13	13	9	9	8	6	10	22	14	18	15	28	14	11	20
MOSCOW	14	14	19	19	13	11	8	9	30	9	26	10	29	29	5
CAL_IT	15	15	8	8	3	5	29	23	4	20	7	19	13	10	21
NANJING	16	16	28	28	28	27	4	21	19	25	9	1	11	13	22
CAMBRIDGE	17	17	5	5	1	2	26	17	8	19	4	5	1	2	15
MOSC_EPI	18	18	29	29	25	26	6	7	29	6	30	18	30	30	7
WISCONSIN	19	19	23	23	22	21	14	8	22	8	19	20	24	25	9
PRINCETON	20	20	21	21	19	25	22	25	1	23	2	8	3	1	23
NAPELS	21	21	17	17	5	7	25	5	27	5	27	12	20	21	4
SORBONNE	22	22	13	13	7	4	16	14	10	14	18	23	15	15	13
U_AUT_MADRID	23	23	27	27	24	24	23	6	21	7	25	15	19	19	8
OHIO	24	24	24	24	21	23	27	4	25	4	20	13	18	17	6
PISA	25	25	18	18	4	3	28	3	26	2	28	9	26	26	2
HARVARD	26	26	20	20	16	19	19	16	2	17	3	25	10	8	18
UVA	27	27	22	22	15	16	15	13	12	13	17	30	22	23	14
KYOTO	28	28	30	30	26	28	9	15	9	16	10	17	23	28	16
BOLOGNA	29	29	26	26	20	20	24	2	28	3	29	11	25	24	3
GENOA	30	30	16	16	2	1	30	1	24	1	22	7	17	18	1
	#P	%P	#C	%C	FWCI	**sd** FWCI	**FW** top%	Nr Auth	**FWCI**/ aut	Nr Inst	**FWCI**/ inst	Top Prom	CiteSc	SNIP	views/