

# Bibliometric Analysis "Materials Chain"

UA Ruhr | 15.11.2016 | Dr. Dirk Tunger, Andreas Meier, Philipp Zeitler

# Introduction to the bibliometric study

## **Time period of observation:**

2011 – 2015

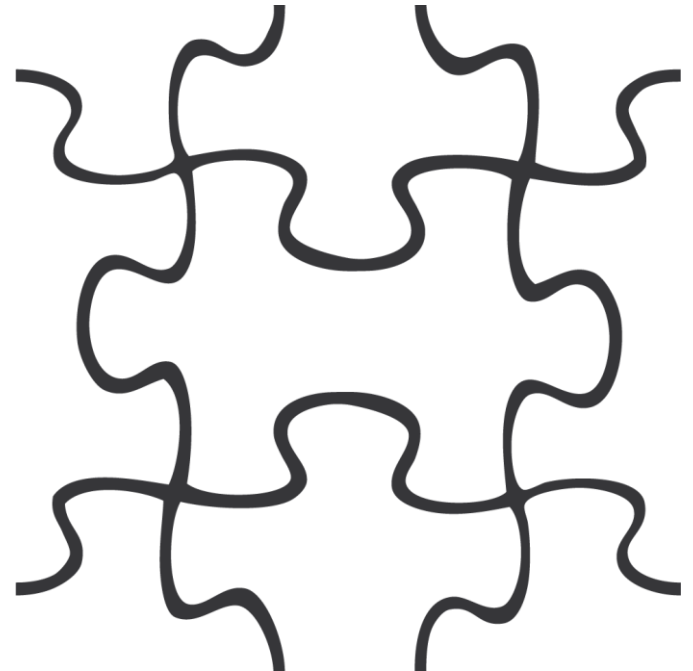
## **Databases used:**

Web of Science and Scopus

**Aim:** Creation of a modular bibliometric study focusing on the publication behavior of "Materials Chain" at UA Ruhr

Module 1 und 2 are reflecting the **classic bibliometric** indicators

Module 3 und 4 are based on **social network analysis** and focusing on the structures.



# Databasis

Based on a list of MC-members search queries which were defined for the scientific databases "Web of Science" and "Scopus". Every name is connected to the institution he or she is affiliated to.

Data status: 1<sup>st</sup> July 2016

Nachname	Vorname	Einrichtung	
<a href="#">Albers</a>	Bettina	University of Duisburg-Essen	Albers, B
<a href="#">Anders</a>	Frithjof B.	TU Dortmund University	Anders, F
<a href="#">Appel</a>	Tamara	Dortmund University of Applied Sciences and Arts	Appel, T
<a href="#">Atakan</a>	Burak	University of Duisburg-Essen	Atakan, B
<a href="#">Awakowicz</a>	Peter	Ruhr-Universität Bochum	Awakowicz, P
<a href="#">Bacher</a>	Gerd	University of Duisburg-Essen	Bacher, G
<a href="#">Barcikowski</a>	Stephan	University of Duisburg-Essen	Barcikowski, S
<a href="#">Bartel</a>	Thorsten	TU Dortmund University	Bartel, T
<a href="#">Barthold</a>	Franz-Joseph	TU Dortmund University	Barthold, F
<a href="#">Bartsch</a>	Marion	Ruhr-Universität Bochum/German Aerospace Center	Bartsch, M
<a href="#">Bathen</a>	Dieter	University of Duisburg-Essen	Bathen, D
<a href="#">Behrens</a>	Malte	University of Duisburg-Essen	Behrens, M
<a href="#">Ben Khalifa</a>	Nooman	TU Dortmund University	Ben Khalifa, N
<a href="#">Benson</a>	Niels Jon	University of Duisburg-Essen	Benson, N
<a href="#">Betz</a>	Markus	TU Dortmund University	Betz, M
<a href="#">Bickendorf</a>	Jobst	TU Dortmund University	Bickendorf, J
<a href="#">Biermann</a>	Dirk	TU Dortmund University	Biermann, D
<a href="#">Birk</a>	Carolin	University of Duisburg-Essen	Birk, C
<a href="#">Bluhm</a>	Joachim Willi Otto	University of Duisburg-Essen	Bluhm, J
<a href="#">Bobisch</a>	Christian Alexander	University of Duisburg-Essen	Bobisch, C
<a href="#">Bock</a>	Claudia	Ruhr-Universität Bochum	Bock, C
<a href="#">Bonpert</a>	Markus	Dortmund University of Applied Sciences and Arts	Bonpert, M

WEB OF SCIENCE™



# 1 **1,573** Au=(Awakowicz, P or Bartsch, M or Bock, C or Chakraborty, S or Dette, H or Devi, A or Drautz, R or Eggeler, G or Eremin, I or Fischer, Roland or Fischer, RA or Frenzel, J or Fries, S or George, E or Gies, H or Gurevich, E or Hackl, K or Hammerschmidt, T or Hartmaier, A or Hägele, D or Hofmann, Martin or Hofmann, MR or Janisch, R or Junker, P or Köhler, Ulrich or Köller, M or Kruggel-Emden, H or Kruggel, H or Kunze, U or Ludwig, Alfred or Madsen, G or Meschke, G or Muhler, M or Nestorovic, T or Ostendorf, A or Pfetzing-Micklich, J or Pfetzing, J or Rogal, J or Roldan Cuenya, B or Schreuer, J or Schuhmann, W or Somsen, C or Stöllner, T or Steinbach, I or Theisen, W or Tschulik, K or Varnik, F or von Keudell, A or Westerholt, K or Wieck, A or Xia, W) and (ad=((ruhr uni\*) same (bochum)) or og=Ruhr University Bochum) and py=2011-2015

Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years

# Publication analysis

## **Aim**

Overview of the publication behavior

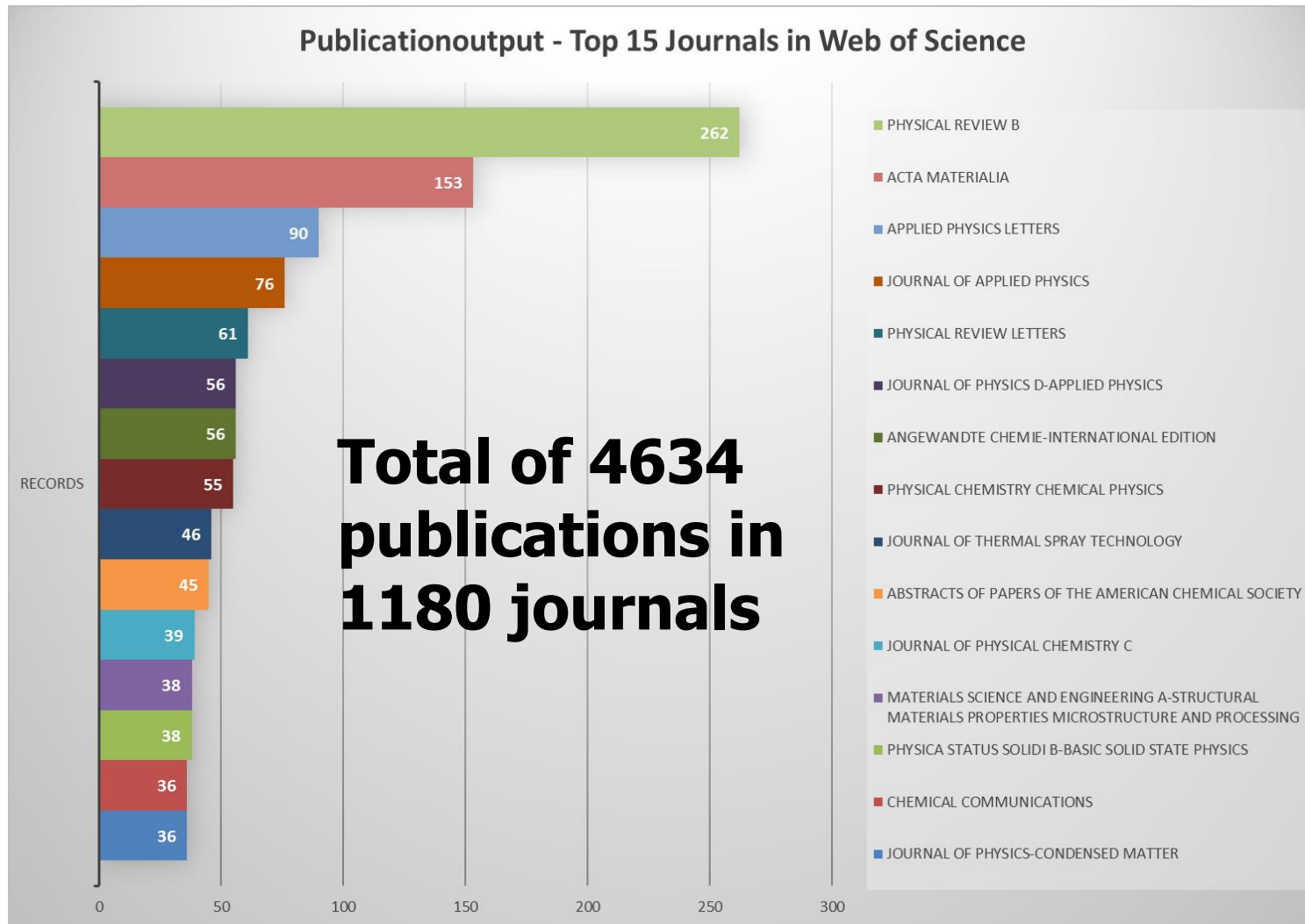
# Publication analysis



## Central questions

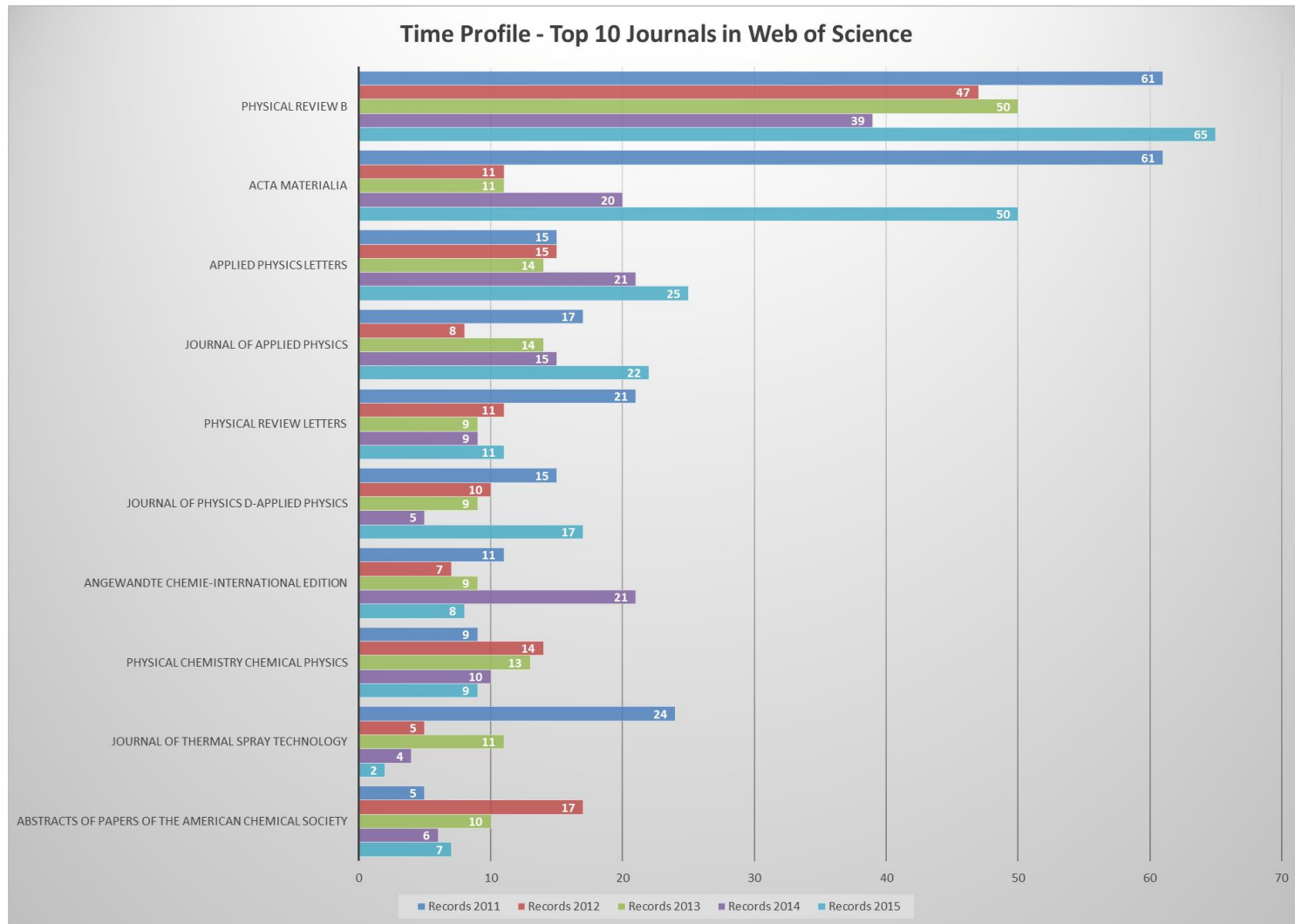
- Were the best sources (Journals) used?
- Are these the journals, MC expects to have the best audience?
- Are important sources missing?

# Publication analysis



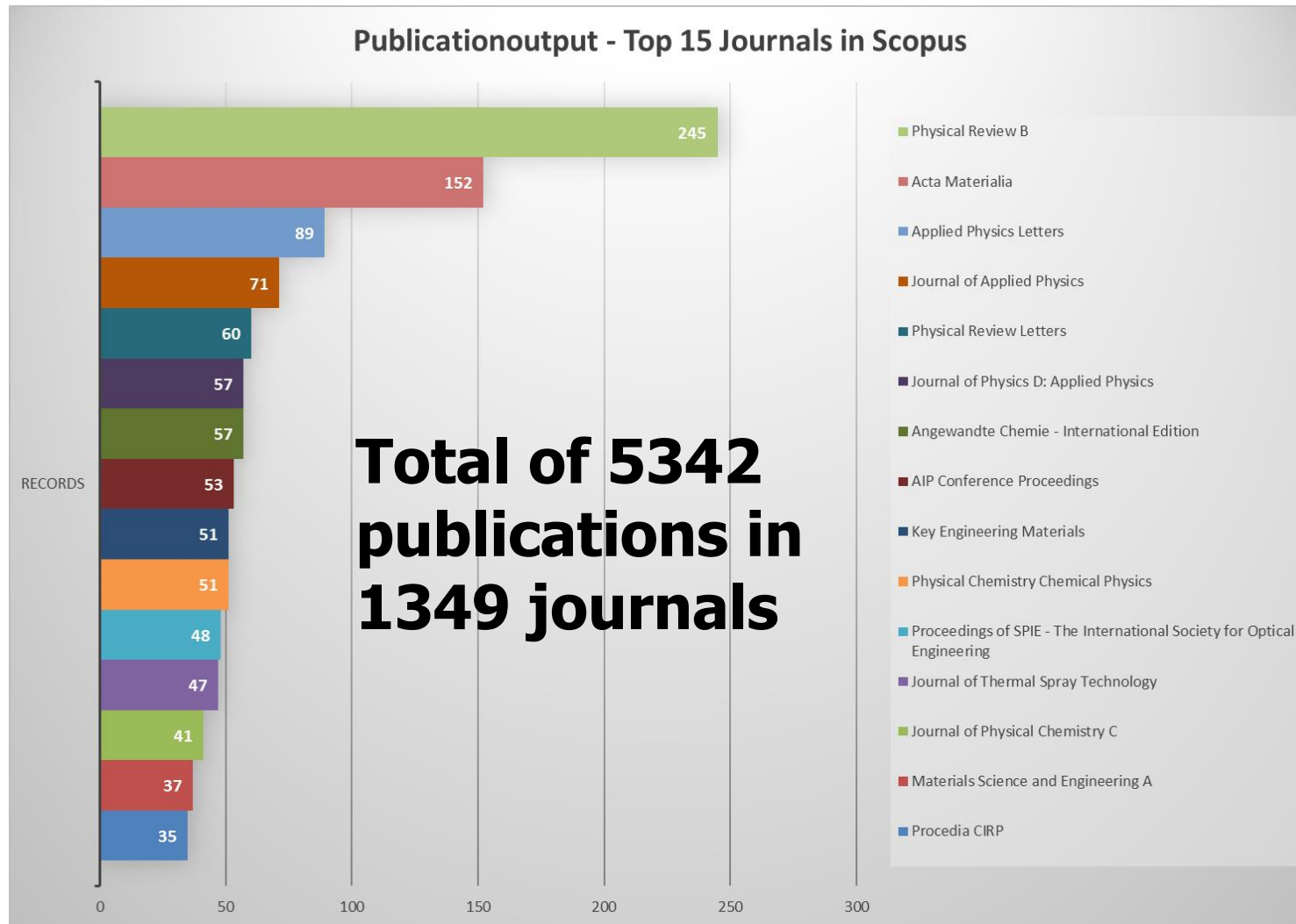
**Please note the skewed distribution of publications over sources:  
1 % of the journals is listed in the diagram, representing 23 % of the publications**

# Publication analysis



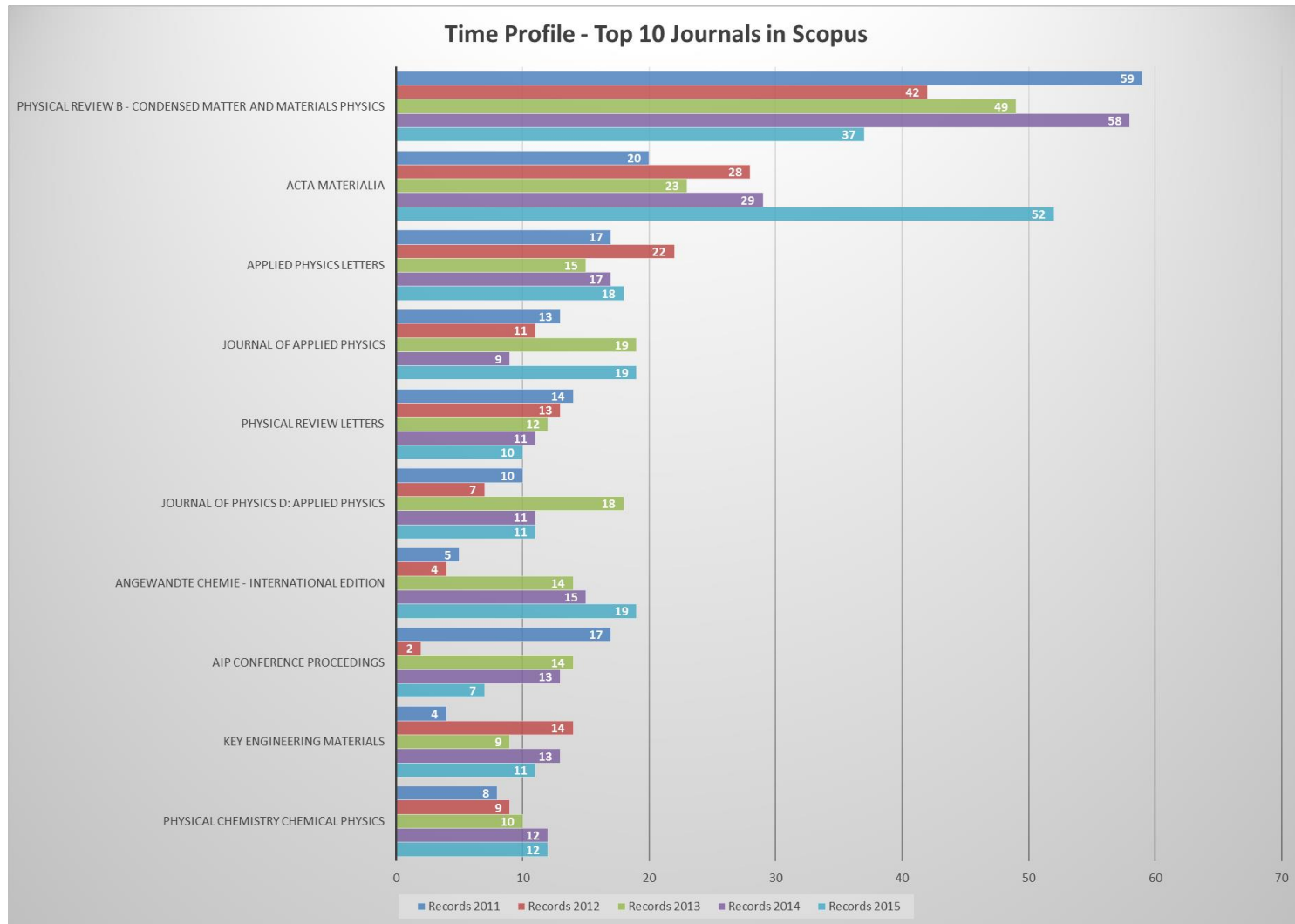
**Publications in journals are not constant over a period of time. Are there publications regularly in the journals, that are important from a scientific or thematic point of view?**

# Publication analysis



**The results of "Web of Science" and "Scopus" are very similar; the number of publications as well as the number of sources is 15 % higher in Scopus in comparison with "Web of Science"**

# Publication analysis



# Citation analysis

## **Aim**

Overview of the citation impact

# Citation analysis



## Central questions

- What are the High-Impact Journals that were used for publication and which are not used?

# Top 10 Journals by Journal Impact Factor (WoS)

Journal	Number of Publications	Number of Citations Top Paper	Citations per Paper (CPP)	Journal Impact Factor 2015
NATURE MATERIALS	3	88	40,0	38,9
NATURE	3	90	38,7	38,1
CHEMICAL REVIEWS	4	344	105,8	37,4
NATURE NANOTECHNOLOGY	3	35	17,7	35,3
SCIENCE	4	34	21,0	34,7
CHEMICAL SOCIETY REVIEWS	6	409	134,0	34,1
REVIEWS OF MODERN PHYSICS	1	174	174,0	33,2
NATURE GENETICS	1	296	296,0	31,6
NATURE PHOTONICS	1	1	1,0	31,2
CELL	1	6	6,0	28,7

**These are the TOP Journals based on Impact Factor that were used for publication by the members of MC.**

# Definition of J-Factor

The J-Factor is a variable that can be used for discipline-independent comparisons based on the relative visibility of publications. It is the only variable that can be directly used to compare different entities across disciplines. The J-Factor describes the relative visibility  $J$  of an entity in comparison with individual scientific communities. The factor is calculated by summation of the ratio of the citation rates of the publications of the entity being investigated and the citation rates of all publications in each of the journals, weighted in each case with the proportion of these publications in the selected journal in relation to all of the entity's publications.

# J-Factor results (WoS)

Institute	J-Factor all document types	Publications total	J-Factor A&R	Publications A&R total
Materials Chain total	108,1%	4627	107,9%	4005
Uni Bochum	97,7%	1561	97,7%	1407
TU Dortmund	107,4%	882	99,1%	697
Uni Duisburg-Essen	105,9%	1681	109,3%	1436

Institute	J-Factor Journals A&R with min. 5 Publications	Publications total
Materials Chain total	104,2%	3430

Institute	J-Factor A&R 2013	Publications A&R 2013
Materials Chain total	108,8%	765
Uni Bochum	92,9%	291
TU Dortmund	109,0%	132
Uni Duisburg-Essen	117,5%	270
<b>Institute Comparison</b>		
RWTH Aachen	118,3%	2836
MIT	129,6%	6339

**The J-factor is approximately 8 % higher than expected. The same result is achieved, if you restrict on document types or on Journals with a minimum of 5 publications.**

**J-Factors of RWTH Aachen and MIT from the year 2013 were used for comparison.**

# Network analysis

## **Aim**

Overview of the structure of the cooperation between the members of MC

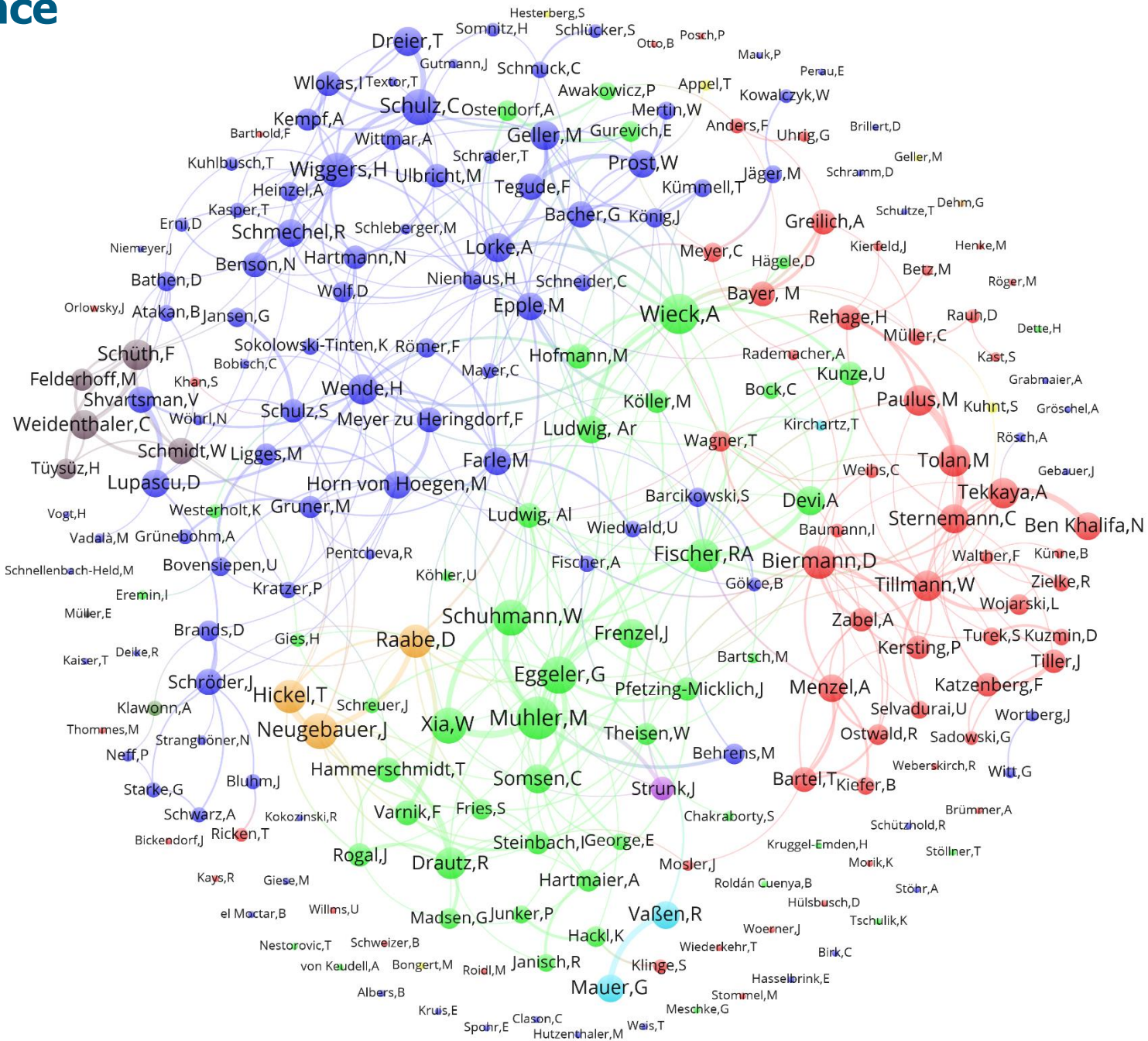
# Network analysis



## Central Question

- Who is cooperating with whom?

# Web of Science 2011-2015



# Network analysis

The network shows the single members of MC and the connections to the other members he or she co-published with. A thicker line indicates a stronger co-publication activity. The network does not change over time. That means that there is a high level of continuity in the cooperation behavior.

# Content analysis

## **Aim**

Overview on topics and keywords

# Content analysis

## Central Question

- What are the topics or buzzwords the publications are about?



# Content analysis explanations

The more central a term for the examined documents, the more central is the position of this term in the network. Centrality arises from the fact that a concept with a large number of the other terms occurs together in the same documents. On the other hand, frequently occurring terms which are only mentioned together with a small number of other terms are further outwards in the representation. In addition, the terms which are most common together, are clustered together. Clusters are characterized by the same color of the circles and form thematic sub-areas of the analysis. The size of the circles is proportional to the occurrence of a single concept. A thesaurus does exclude non-meaningful terms and synonyms.

The diagram does not have any axes.

The bubble charts are showing the main buzzwords, concepts and topics, the scientific papers of MC are about.

**Minimum occurrence of a term: 15**



# Conclusion

- The results on the publication behavior and high-impact journals make it possible to develop a publication strategy.
- The J-Factor represents the citation impact and shows that the publications of MC are cited as often as expected.
- The network analysis showed the single members of MC and their co-publication behavior. The network does not change over time. That means that there is a high level of continuity in the cooperation behavior.
- The bubble charts are showing the main buzzwords, concepts and topics, the scientific papers of MC are about.



# Thank you!

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