CEvNS in Munich

Victoria Wagner & Raimund Strauss

Technical University Munich

March 22nd 2023

Carl-Friedrich von Siemens Stiftung

Pioneering work in Munich

PHYSICAL REVIEW D VOLUME 30, NUMBER 11 1 DECEMBER 1984

Principles and applications of a neutral-current detector for neutrino physics and astronomy

A. Drukier and L. Stodolsky
Max-Planck-Institut für Physik und Astrophysik, Werner-Heisenberg-Institut für Physik, Munich, Federal Republic of Germany
(Received 21 November 1983)

We study detection of MeV-range neutrinos through elastic scattering on nuclei and identification of the recoil energy. The very large value of the neutral-current cross section due to coherence indicates a detector would be relatively light and suggests the possibility of a true "neutrino observatory." The recoil energy which must be detected is very small ($10-10^3$ eV), however. We examine a realization in terms of the superconducting-grain idea, which appears, in principle, to be feasible through extension and extrapolation of currently known techniques. Such a detector could permit determination of the neutrino energy spectrum and should be insensitive to neutrino oscillations since it detects all neutrino types. Various applications and tests are discussed, including spallation sources, reactors, supernovas, and solar and terrestrial neutrinos. A preliminary estimate of the most difficult backgrounds is attempted.

Pioneering work in Munich

PHYSICAL REVIEW D VOLUME 30, NUMBER 11 1 DECEMBER 1984

Principles and applications of a neutral-current detector for neutrino physics and astronomy

A. Drukier and L. Stodolsky
Max-Planck-Institut für Physik und Astrophysik, Werner-Heisenberg-Institut für Physik, Munich, Federal Republic of Germany
(Received 21 November 1983)

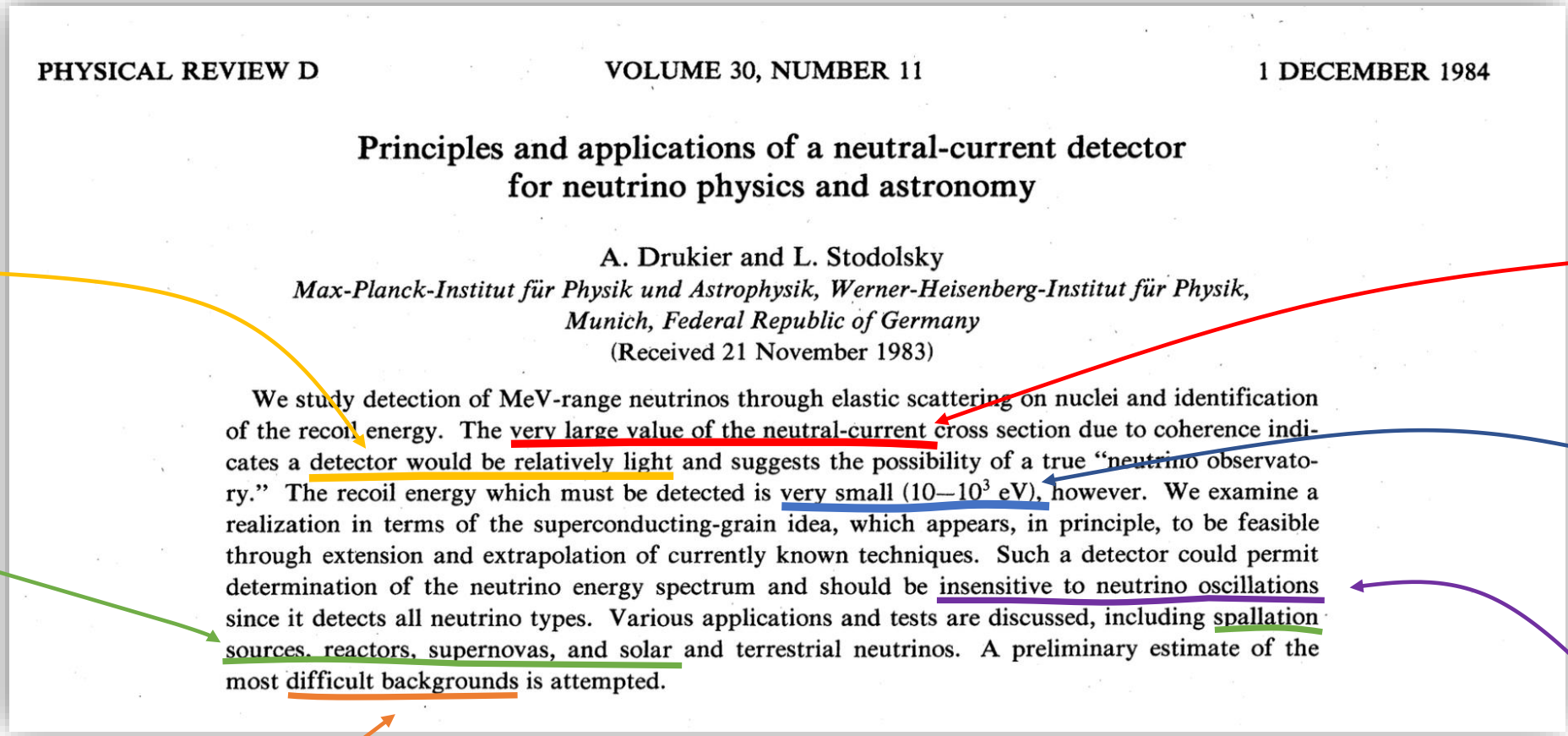
We study detection of MeV-range neutrinos through elastic scattering on nuclei and identification of the recoil energy. The very large value of the neutral-current cross section due to coherence indicates a detector would be relatively light and suggests the possibility of a true "neutrino observatory." The recoil energy which must be detected is very small (10—10^3 eV), however. We examine a realization in terms of the superconducting-grain idea, which appears, in principle, to be feasible through extension and extrapolation of currently known techniques. Such a detector could permit determination of the neutrino energy spectrum and should be insensitive to neutrino oscillations since it detects all neutrino types. Various applications and tests are discussed, including spallation sources, reactors, supernovas, and solar and terrestrial neutrinos. A preliminary estimate of the most difficult backgrounds is attempted.

CEvNS is strong

CEvNS is tiny

CEvNS is clean

Pioneering work in Munich



PHYSICAL REVIEW D VOLUME 30, NUMBER 11 1 DECEMBER 1984

Principles and applications of a neutral-current detector for neutrino physics and astronomy

A. Drukier and L. Stodolsky
Max-Planck-Institut für Physik und Astrophysik, Werner-Heisenberg-Institut für Physik, Munich, Federal Republic of Germany
(Received 21 November 1983)

We study detection of MeV-range neutrinos through elastic scattering on nuclei and identification of the recoil energy. The very large value of the neutral-current cross section due to coherence indicates a detector would be relatively light and suggests the possibility of a true "neutrino observatory." The recoil energy which must be detected is very small (10—10^3 eV), however. We examine a realization in terms of the superconducting-grain idea, which appears, in principle, to be feasible through extension and extrapolation of currently known techniques. Such a detector could permit determination of the neutrino energy spectrum and should be insensitive to neutrino oscillations since it detects all neutrino types. Various applications and tests are discussed, including spallation sources, reactors, supernovas, and solar and terrestrial neutrinos. A preliminary estimate of the most difficult backgrounds is attempted.

Small detectors

CEvNS is strong

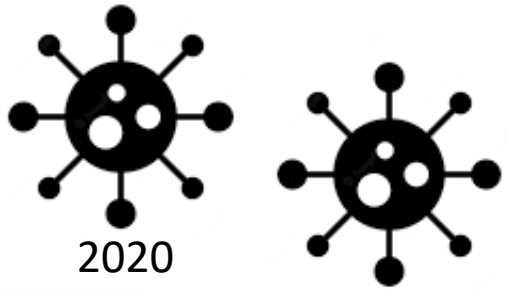
CEvNS is tiny

experimental ideas

CEvNS is clean

Backgrounds (!)

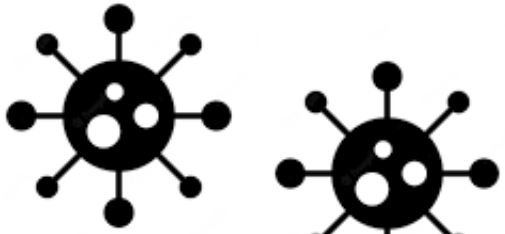
40 Years later…



participants

time

40 Years later…



2020

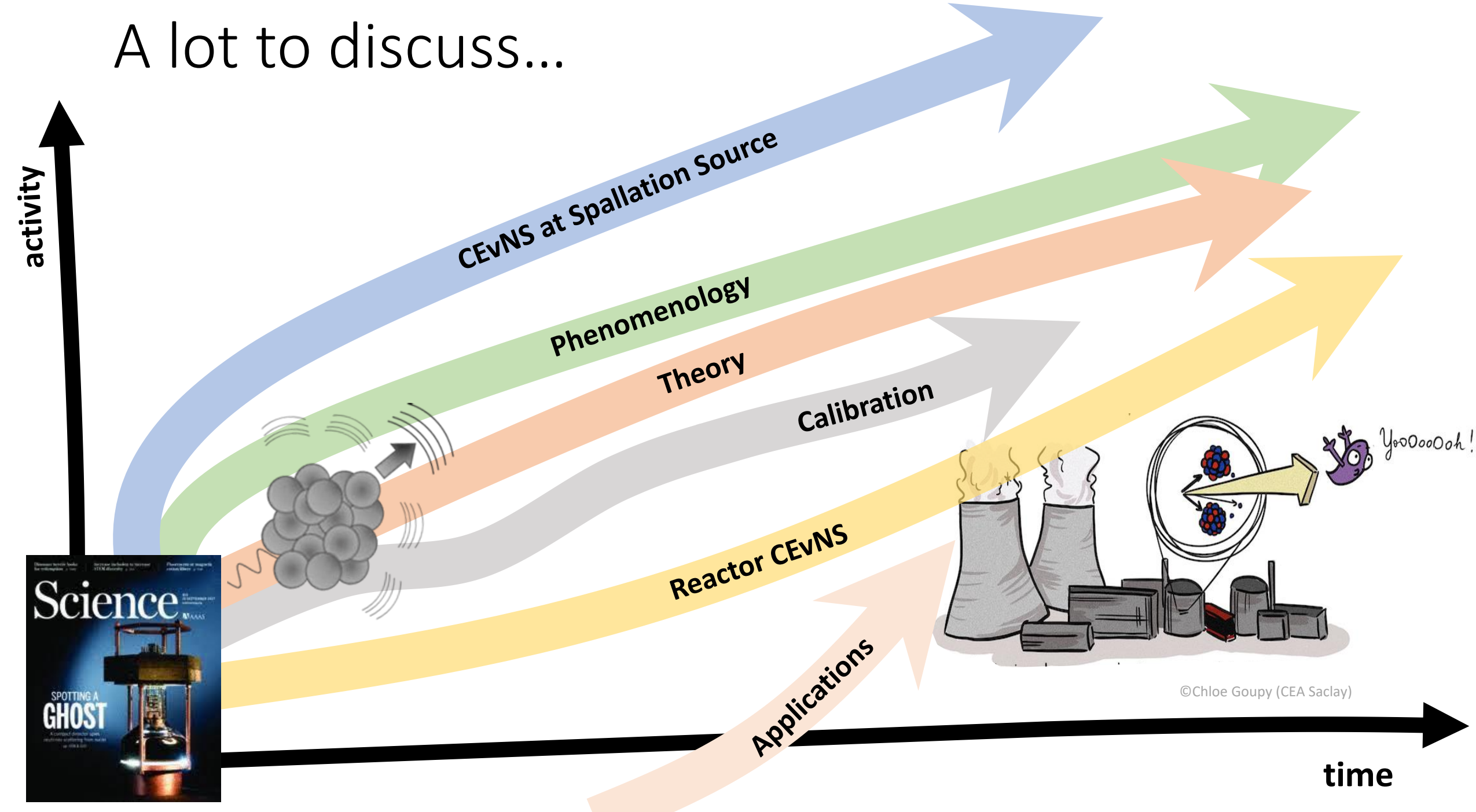
2021

2023

participants

time

A lot to discuss…



Merci [meàsse]

Carl Friedrich von Siemens Stiftung

SFB 1258 Neutrinos Dark Matter Messengers

DFG Deutsche Forschungsgemeinschaft

Merci [meàsse]

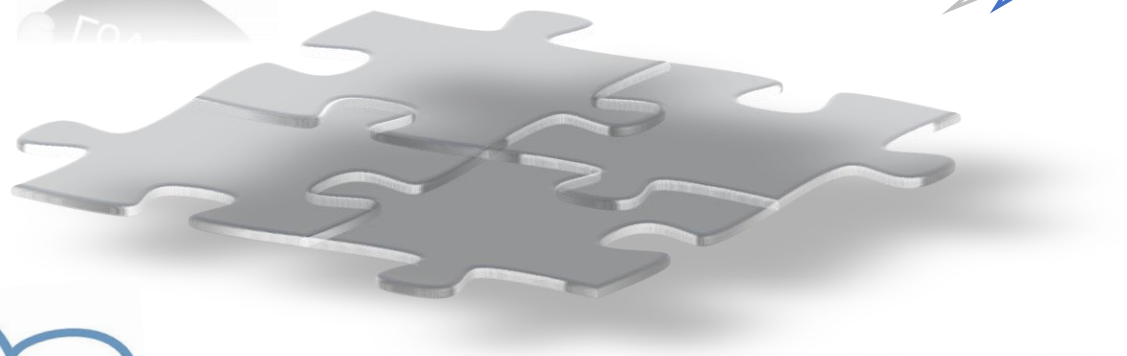
International Advisory Committee

Phillip Barbeau
Matthew Green
Janina Hakenmüller
Diane Markoff
Grayson Rich
Kate Scholberg
Raimund Strauss
Louis Strigari
Victoria Wagner

Local Organizing Committee

Raimund Strauss (Co-chair)
Victoria Wagner (Co-chair)
Andreas Erhart
Margarita Kaznacheeva
Angelina Kinast
Paola Mucciarelli
Tobias Ortmann
Luca Pattavina
Lilly Peters
Petra Riedel
Johannes Rothe
Nicole Schermer
Sabine Wenzel
Alexander Wex

Welcome to Munich



Carl Friedrich
von Siemens Stiftung

MUNICH

March 22 – 24, 2023

ORIGINS Excellence Cluster

SFB 1258 Neutrinos Dark Matter Messengers

DFG Deutsche Forschungsgemeinschaft

Carl Friedrich von Siemens Stiftung

☕ Coffee breaks

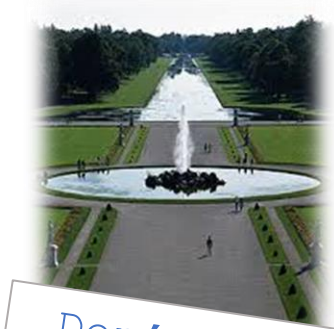
🍽 Lunch breaks (all vegetarian, vegan on demand)

❗ Please be <u>on time</u> in the morning & wear your badge

❗ Ring the bell if you are late

In the garden

Nymphenburg Castle & Park



Don't forget to come back

https://www.schloss-nymphenburg.de/englisch/palace/

https://indi.to/J9jWv

	Wednesday	Thursday	Friday	Saturday
09:00	Welcome/ Intro	Pheno/ Theory 2	Experiments 5	
	Experiments 1			kick-off coffee
		coffee break	coffee break	Welcome
11:00	coffee break	Experiments 3	Experiments 6	
	Pheno/ Theory 1			
12:30	lunch break		lunch break	lunch break
		lunch break		
14:00	Experiments 2		Pheno/ Theory 4	Panel Discussion
		Experiments 4	coffee break	
	coffee break		Summary Exp	coffee break
16:00	Poster presentations	coffee break	Summary Theo	
			Closing	
		Pheno/ Theory 3		
18:00	Poster Session & Dinner			

Instructions for Speaker & Discussions

- Please upload talks

  https://indi.to/J9jWv (Indico) or by email to mag7s.munich@gmail.com

- We will be strict on timing: 15 + 5 min (20 + 5 min)

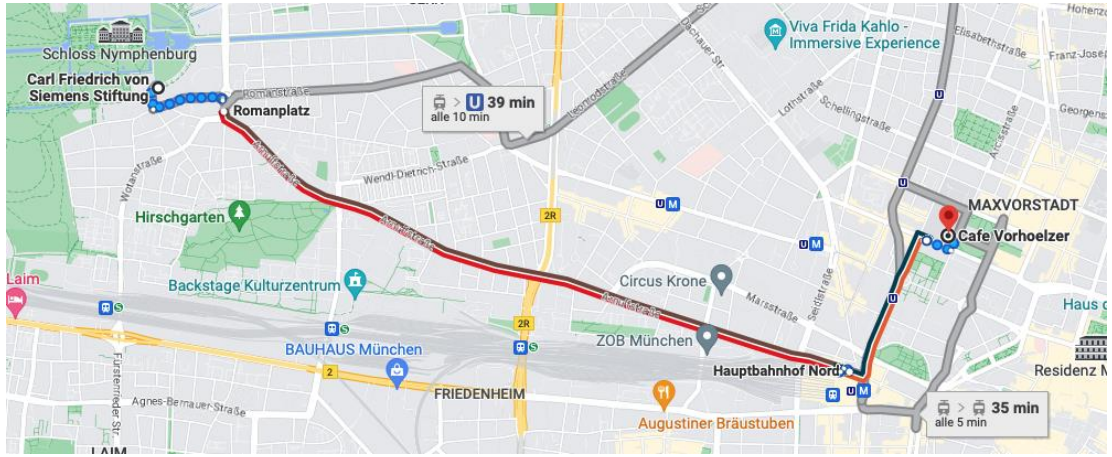
- Discussions on Slido (remote & anonymous questions)

https://app.sli.do/event/aJnfUYSkFPo3C2U57HhVGA

Poster Session & Social Dinner

- If not you have not yet registered, please do so at the registration desk
- Participation fee: 150 EUR (in cash)
- Start: 6 pm (Posters & finger food)

https://goo.gl/maps/6wZoK8ub3w3ihMdV7



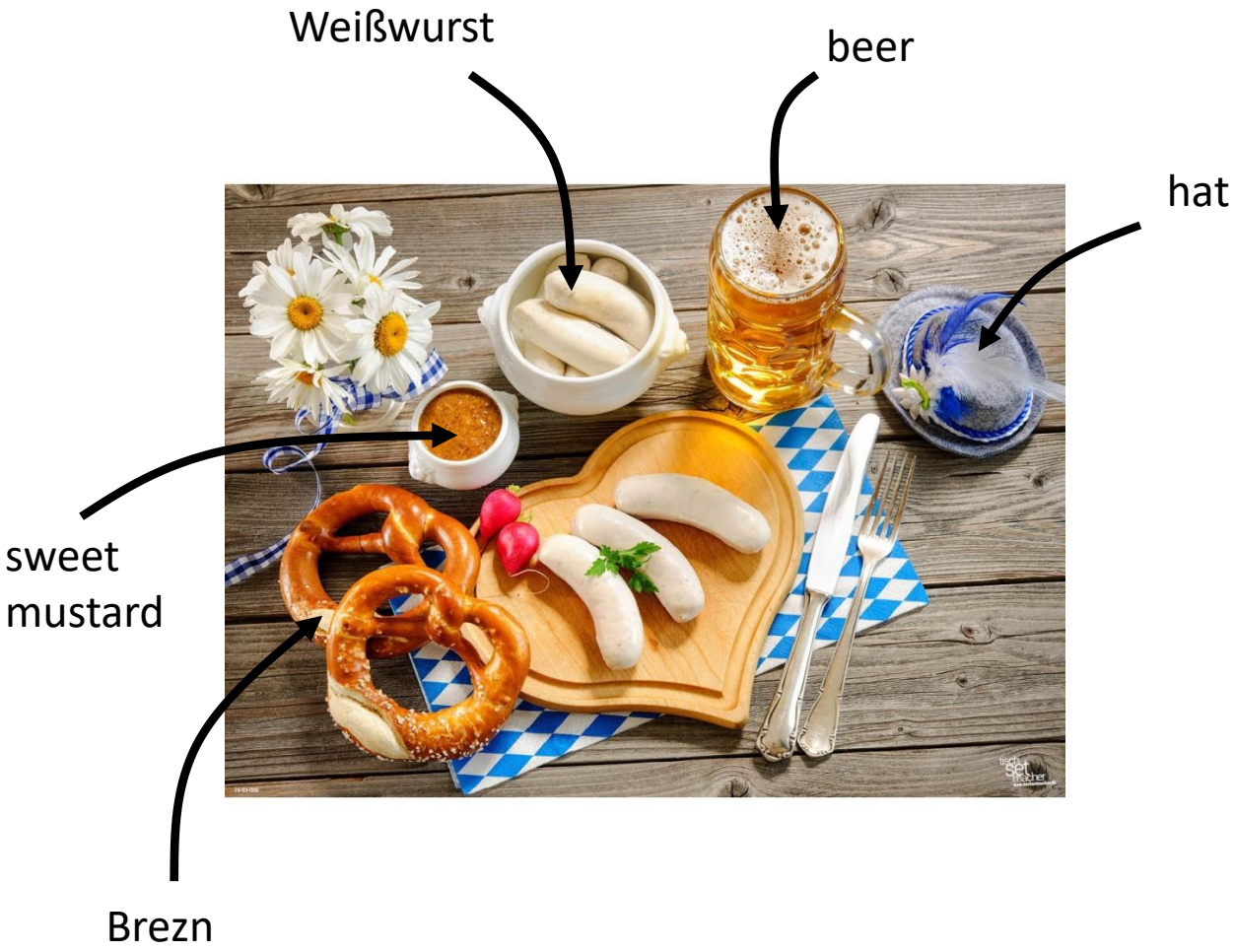
… Friday is not the end …

Location: Vorhoelzer Forum
(https://goo.gl/maps/DdkDyESfyPThqRkS9)

Location: Garching, Physics Department
(https://goo.gl/maps/vuuf7CKDhbrmCTPGA)

The Ultimate Munich Experience – Step 1

Start: 11:55am



https://www.youtube.com/watch?v=NdjUQfY2Ejw

The Ultimate Munich Experience – Step 2

Enjoy the City Center

Guided Tour at 1:30pm

Beer Festival

Nockherberg at 4:30pm

Detailed instructions will be provided!

https://indi.to/J9jWv

Welcome to Munich!

Enjoy Mag7s.