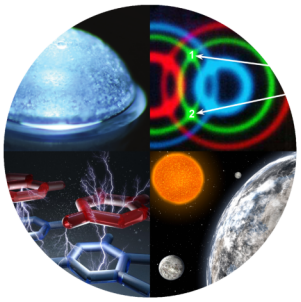

Münchner Physik-Kolloquium

Winter 2022/23

Vortragsprogramm mit Abstracts

Beginn der Veranstaltungen ist um 17:15 Uhr, sofern keine besondere Anfangszeit vermerkt ist. Sämtliche Vorträge sind öffentlich bei freiem Eintritt.

LMU bezeichnet Vorträge im Hörsaal H 030, Fakultät für Physik der LMU, Schellingstraße 4, München (U-Bahn U3/U6, Haltestelle Universität).

TUM bezeichnet Vorträge im Hörsaal 2, Physik-Department der TUM, James-Franck-Straße 1, Garching (U-Bahn U6, Haltestelle Garching-Forschungszentrum).

Neben der Veranstaltung vor Ort sind die Vorträge in diesem Semester auch als Videoübertragung im Internet verfügbar:
https://tum-conf.zoom.us/j/93234766313
Meeting-ID: 932 3476 6313
Password: Kolloquium
Software bitte möglichst vorab installieren.

Aktuelle Informationen finden sich jeweils hier:
http://www.ph.tum.de/kolloquium

How active flow networks process information for complex behaviour

Prof. Dr. Karen Alim LMU **2022-10-24**
Technische Universität München

Propagating, storing and processing information is key to take smart decisions – for organisms as well as for autonomous devices. In search for the minimal units that allow for complex behaviour the slime mould Physarum polycephalum stands out by solving complex optimization problems despite its simple make-up. Physarum's body is an interlaced network of fluid-filled tubes lacking any nervous system, in fact being a single gigantic cell. Yet, Physarum finds the shortest path through a maze. We unravel that Physarum's complex behaviour emerges from the physics of active flows shuffling through its tubular networks. Flows transport information, information that is stored in the architecture of the network. Thus, tubular adaptation drives processing of information into complex behaviour. Taking inspiration from the mechanisms in Physarum we outline how to embed complex behaviour in active microfluidic devices and how to program human vasculature.

Canceled: new date 2022-12-05! A walk through the world of chiral dynamics

Prof. Dr. Ulf-G. Meißner **2022-11-07**
Universität Bonn und Forschungszentrum Jülich

This Colloquium date had to be postponed to 5 December 2022. Further information is to be found at that date.

Plasmonics and Photonics for Energy Conversion

Prof. Dr. Emiliano Cortés TUM **2022-11-21**
Ludwig-Maximilians-Universität München

The use of plasmonics and photonics to control light and heat close to the thermodynamic limit enables exciting opportunities for nanoscale energy conversion. The efficient harvesting and conversion of photons into photons of a different energy, phonons or energetic charge carriers open up a myriad of opportunities for converting, for example sunlight, into fuels, heat and light. By employing artificially structured materials (metamaterials), hybrid plasmonic colloids, dielectric nanoresonators or engineered metal nanoantennas, I will show different approaches for converting energy by controlling, tuning and enhancing light-matter interactions.

Festkolloquium für Wolfram Weise und Norbert Kaiser

A walk through the world of chiral dynamics

Prof. Dr. Ulf-G. Meißner TUM **2022-12-05**

Universität Bonn und Forschungszentrum Jülich

The physics of hadrons, nuclei and nuclear matter can be described in terms of pertinent effective field theories, here chiral dynamics in various settings. In this talk, I highlight some of the important works done by Norbert Kaiser and Wolfram Weise in this field. Topics include the enigmatic $\Lambda(1405)$ baryon, the nuclear force problem and strangeness nuclear physics.

FRM II.5 – An LEU solution for a sustainable operation of Germany's most powerful neutron source

Dr. Christian Reiter TUM **2022-12-19**

Forschungs-Neutronenquelle Heinz Maier-Leibnitz, TUM

The Forschungs-Neutronenquelle Heinz Maier-Leibnitz (FRM II) is Germany's most powerful research reactor and uses Highly Enriched Uranium (HEU) fuel enriched at 93 %. The Technical University of Munich (TUM) operates the reactor and actively works towards the conversion of the FRM II to a lower enrichment fuel. Due to the international situation, TUM pursues a solution using Low Enriched Uranium (LEU) as this is the most sustainable on for the FRM II in the long run. In this talk, I'll present that a conversion of FRM II to LEU is scientifically possible when using the novel monolithic U-10Mo fuel system, which still needs to be qualified in Europe/Germany. With an Uranium density of $15.5\,\mathrm{gU/cm^3}$ monolithic U-10Mo would replace the current U_3Si_2 fuel with a Uranium density up to $3.0\,\mathrm{gU/cm^3}$.

The models and methods used to find such possible conversion scenarios are elaborated. Specifically tailored computational methods and coupling schemes have also been developed to properly evaluate all relevant characteristics for the conversion of the FRM II reactor. The thermo-physical and mechanical properties of the fuel candidate have been also measured to be fed in the computational models. With that, a systematic parameter study has been performed to identify viable conversion scenarios. The results of that study indicate that many LEU designs using monolithic U-10Mo appear to be viable to convert FRM II to LEU. One example of an LEU solution for the FRM II reactor and the corresponding performance parameters will be discussed in more detail.

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Prof. Dr. Stephanie Hansmann-Menzemer

TUM **2023-01-09**

Physikalisches Institut, Universität Heidelberg

LMU **2023-01-16**

TUM **2023-01-23**

LMU **2023-01-30**

Bread and Butter Physics

Prof. Dr. Matthias Schott TUM **2023-02-06**

Johannes Gutenberg Universität Mainz

No new elementary particles have been discovered at the LHC since more than ten years. Does this imply, that collider physics becomes boring in the next decades? My clear answer is no! There are many open questions within the Standard Model which can only be addressed at the LHC in the coming years, potentially opening the door to new physics. Most prominent hints are the recent measurement of the W boson mass at the CDF Experiment as well as the long standing discrepancy of the anomalous magnetic dipole moment of the muon. In this talk, I will give a brief overview of selected and highly exciting results which are expected in the coming years, starting from the properties of the W boson, over the search for axion-like particles to smaller new experiments.

Allgemeine Informationen

Das Münchner Physik-Kolloquium ist das Podium der physikalischen Forschung im Münchner Raum. Es wird gemeinsam von den beiden Universitäten und den entsprechenden Max-Planck-Instituten veranstaltet. Die Vorträge berichten über aktuelle Themen der Physik und angrenzender Gebiete und spiegeln den interdisziplinären Charakter der modernen Physik wider.

Die Darstellung wird möglichst allgemeinverständlich gehalten, um auch physikalisch interessierte Zuhörer aus dem industriellen oder schulischen

Bereich anzusprechen. Die Vortragenden sind ausgewiesene Fachleute auf dem jeweiligen Gebiet, zum Teil auch neu nach München berufene Wissenschaftler, die sich in diesem Rahmen einer breiteren Öffentlichkeit vorstellen wollen. Das Kolloquium stellt insbesondere für die Studierenden der Physik eine einfache Möglichkeit dar, im Laufe eines Jahres alle wichtigen Arbeitsgebiete der gegenwärtigen physikalischen Forschung kennen zu lernen.

Es ist erklärtes Anliegen des Münchner Physik-Kolloquiums, die räumliche Trennung der Physik in die verschiedenen Forschungsstandorte in München und Garching durch eine gemeinsame Veranstaltung zu überbrücken. Dazu soll auch der alternierende Wechsel des Veranstaltungsorts beitragen.

Student event: Meet the speaker

We invite you to a **student-only** discussion-round with the speakers before each Munich Physics Colloquium talk. *Be curious and feel free to ask any question.*

Venue: Mondays, 16:00 h

TUM Seminar room PH 3268 (upper floor), Physik-Department der TUM, James-Franck-Straße 1, Garching
LMU Room H 522 (5th floor), Fakultät für Physik der LMU, Schellingstraße 4, München

The student event takes place at TUM or LMU respectively, depending on the location of the colloquium talk (see program).

Veranstaltende Einrichtungen

Max-Planck-Institute physikalischer Arbeitsrichtung
München / Garching

Technische Universität München
TUM School of Natural Sciences,
James-Franck-Straße 1, 85748 Garching
TUM-Koordinatoren:
Prof. J. Finley, Prof. B. Märkisch

Ludwig-Maximilians-Universität München
Fakultät für Physik, Schellingstraße 4,
80799 München
LMU-Koordinatoren: Prof. T. Birnstiel

Aktuelles Programm: http://www.ph.tum.de/kolloquium