

# **Developments, Problems, and Extensions of Electrodynamics**

**French-German WE-Heraeus-Seminar**

**29 – 23 August 2024**

**at the Physikzentrum Bad Honnef, Germany**

**WILHELM UND ELSE  
HERAEUS-STIFTUNG**



# Program

## Sunday, 18 August 2024

17:00 – 20:00 Registration

18:00 *BUFFET SUPPER and informal get-together*

## Monday, 19 August 2024

08:00 *BREAKFAST*

08:45 – 09:00 Scientific organizers **Welcome words**

09:00 – 10:00 Friedrich W. Hehl **Birefringence and all that: Fresnel wave surface in optics, Kummer surfaces in electrodynamics and in gravitation**

10:00 – 11:00 Yakov Itin **Anisotropic electromagnetism in premetric approach: dispersion relation and photon propagator**

11:00 – 11:30 *COFFEE BREAK*

11:30 – 12:30 Michael Kiessling **BLTP electrodynamics as initial value problem**

12:30 *LUNCH*

# Program

Monday, 19 August 2024

|               |                          |   |
|---------------|--------------------------|---|
| 14:00 – 15:00 | Nazim Djeghloul          | <b>Alternative geometric formulation of classical electromagnetism and unification with gravitation</b> |
| 15:00 – 16:00 | Olaf Lechtenfeld         | <b>From Yang-Mills in de Sitter space to Maxwell knots</b>  |
| 16:00 – 16:30 | <i>COFFEE BREAK</i>      |   |
| 16:30 – 17:00 | Germann Hergert          | <b>Ultra-nonlinear subcycle emission of few-electron states</b>   |
| 17:00 – 17:30 | Gabriel Camacho De Pinho | <b>Quantum vacuum dispersion forces in Proca Electrodynamics</b>  |
| 17:30 – 18:30 | <b>Discussion</b>        |   |
| 18:30         | <i>DINNER</i>            |   |

# Program

Tuesday, 20 August 2024

|               |   |  |
|---------------|---|--|
| 08:00         | <i>BREAKFAST</i>                            |  |
| 09:00 – 10:00 | Rainer Mandel                               | <b>Variational methods for nonlinear time-harmonic Maxwell equations in local and nonlocal media</b> |
| 10:00 – 11:00 | Jonathan Agil                               | <b>Vacuum magnetic birefringence: an optical test of non-linear electrodynamics</b>                  |
| 11:00 – 11:30 | <i>COFFEE BREAK</i>                         |  |
| 11:30 – 12:30 | Claudio Paganini                            | <b>Gravitational spin hall effect of light</b>   |
| 12:30         | <i>LUNCH</i>                                |  |
| 14:00 – 15:00 | José Abdalla Helayël-Neto ( <i>online</i> ) | <b>Modified dispersion relations, massive photons and non-maxwellian extensions</b>                  |
| 15:00 – 16:00 | Eloy Ayón-Beato ( <i>online</i> )           | <b>On the electrodynamics of the first nonlinearly charged spinning black hole</b>                   |
| 16:00 – 16:30 | <i>COFFEE BREAK</i>                         |  |
| 16:30 – 17:00 | Abedennour Dib                              | <b>Extended theories of electromagnetism: effective mass in non-linear theories</b>                  |
| 17:00 – 17:30 | <b>Poster flashes</b>                       |  |
| 17:30 – 18:30 | <b>Posters</b>                              |  |
| 18:30         | <i>DINNER</i>                               |  |

# Program

Wednesday, 21 August 2024

|               |  |  |
|---------------|--|--|
| 08:00         | <i>BREAKFAST</i>   |  |
| 09:00 – 10:00 | Alessandro Spallicci<br><i>(online)</i>  | <b>Implications of Extended Theories of Electromagnetism (EEM) on astrophysics and cosmology</b> |
| 10:00 – 11:00 | Claus Lämmerzahl   | <b>The physics of active and passive charges</b>   |
| 11:00 – 11:30 | <i>COFFEE BREAK</i>  |  |
| 11:30 – 12:30 | Philippe Bouyer  | <b>Quantum sensors for testing fundamental limits</b>  |
| 12:30         | <i>LUNCH</i>   |  |
| 14:00 – 17:30 | <b>Excursion</b>   |  |
| 18:30         | <i>HERAEUS DINNER</i><br><i>(social event with cold &amp; warm buffet with complimentary drinks)</i> |  |

# Program

Thursday, 22 August 2024

|               |                       |  |
|---------------|-----------------------|--|
| 08:00         | <i>BREAKFAST</i>      |  |
| 09:00 – 10:00 | Jan-Willem van Holten | <b>Magnetic fields of compact astrophysical bodies</b>   |
| 10:00 – 11:00 | Cherry Ng-Guiheneuf   | <b>Fast radio bursts: A brief review</b>   |
| 11:00 – 11:30 | <i>COFFEE BREAK</i>   |  |
| 11:30 – 12:30 | Guillaume Voisin      | <b>Electrodynamics in neutron-star magnetospheres</b>  |
| 12:30         | <i>LUNCH</i>          |  |
| 14:00 – 15:00 | Nick Mavromatos       | <b>Aspects of non-linear electrodynamics and collider searches via light-by-light scattering</b> |
| 15:00 – 16:00 | Krzysztof Piotrkowski | <b>High energy photon-photon interactions at colliders</b>                                       |
| 16:00 – 16:30 | <i>COFFEE BRREAK</i>  |  |
| 16:30 – 17:00 | Detlef Hoyer          | <b>Useful predictions from 5D vaccum equation</b>  |
| 17:00 – 18:30 | <b>Discussion</b>     |  |
| 18:30         | <i>DINNER</i>         |  |

# Program

**Friday, 23 August 2024**

|               |                       |   |
|---------------|-----------------------|---|
| 08:00         | <i>BREAKFAST</i>      |   |
| 09:00 – 10:00 | Salvatore Capozziello | <b>Resonant graviton-photon transitions with cosmological stochastic magnetic field</b> |
| 10:00 – 11:00 | Volker Perlick        | <b>Maxwell equations on Finsler spacetimes</b>  |
| 11:00 – 11:30 | <i>COFFEE BREAK</i>   |   |
| 11:30 – 12:30 | Robertus Potting      | <b>Standing waves in Born-Infeld theory</b>   |
| 12:30 – 12:45 | Scientific organizers | <b>Closing words</b>  |
| 13:00         | <i>LUNCH</i>          |   |

**End of the seminar**

**Departure of participants who announced their departure for Friday**

*NO DINNER for participants leaving on Saturday; however, a self-service breakfast will be provided on Saturday morning*