# Unifying physics and technology in light of Maxwell's equations

**Monday 16 – Tuesday 17 November 2015**

**Organised by Professor Anatoly Zayats, Professor John Ellis CBE FRS and Professor Roy Pike FRS**

THE ROYAL SOCIETY

| DAY 1 | | | | DAY 2 | | | |
|---|---|---|---|---|---|---|---|
| **SESSION 1**<br>**Unification theories**<br>**Chair: John Ellis CBE FRS** | | **SESSION 2**<br>**Solid state analogies**<br>**Chair: Joe Bhaseen** | | **SESSION 3**<br>**Quantum optics**<br>**Chair: Roy Pike FRS** | | **SESSION 4**<br>**Photonics and nanophotonics**<br>**Chair: Anatoly Zayats** | |
| **09.00** | Welcome by Julie Maxton & lead organiser | | | | | | |
| **09.05** | **Tom Kibble CBE FRS**<br>Genesis of electrow eak unification | **14.15** | **Roderich Moessner**<br>Electromagnetism as an emergent phenomenon in condensed matter | **09.00** | **Ian Walmsley FRS**<br>Quantum enhanced technologies using light | **13.30** | **David Payne**<br>Optical fibres: The best electromagnetic w aveguides ever |
| **09.30** | Discussion | | | **09.30** | Discussion | **14.00** | Discussion |
| **09.45** | **Frank Wilczek**<br>Unification today | **14.45** | Discussion | **09.45** | **Mikhail Lukin**<br>New frontiers of quantum optical science | **14.15** | **Frederico Capasso**<br>From quantum cascade lasers to metasurfaces |
| **10.15** | Discussion | | | **10.15** | Discussion | **14.45** | Discussion |
| **10.30** | Coffee | **15.00** | Tea | **10.30** | Coffee | **15.00** | Tea |
| **11.00** | **Jonathan Butterworth**<br>Standard model: how far can it go, and how can w e tell? | **15.30** | **Subir Sachdev**<br>Emergent electromagnetism and superconductivity | **11.00** | **Ruth Oulton**<br>Putting a spin on photonic crystal w aveguides | **15.30** | **Thomas Ebbesen**<br>Hybrid light-matter states in dressed molecules |
| **11.30** | Discussion | **16.00** | Discussion | **11.30** | Discussion | **16.00** | Discussion |
| **11.45** | **Tejinder Virdee FRS**<br>Beyond the standard model of particle physics | **16.15** | **Steven Bramwell**<br>Experiments on emergent magnetic monopoles in spin ice | **11.45** | **Roy Glauber**<br>Photon statistics | **16.15** | **John Pendry FRS**<br>Maxw ell, Einstein, and transformation optics |
| **12.15** | Discussion | | | | | | |
| **12.30** | **Veronica Sanz**<br>Theoretical landscape beyond the Standard Model | **16.45** | Discussion | **12.15** | Discussion | **16.45** | Discussion |
| **13.00** | **Discussion** | | | | | **17.00** | **Peter Knight FRS**<br>Closing remarks |
| **13.15** | LUNCH | **17.00** | CLOSE | **12.30** | LUNCH | **17.15** | CLOSE |

*Draft programme – correct as of **16 September 2015** – subject to change*