

## **IAS Seminar**

**Topic:** **New physics by linking relativity and quantum uncertainty**

**Speaker:** Dr Mike McCulloch, Faculty of Science & Environment, University of Plymouth, UK

**Contents:** A new explanation for inertial mass has been suggested (McCulloch, 2007, 2013, 2017) that links quantum mechanics and relativity by assuming that inertia is due to Unruh radiation. This model is called quantised inertia and it predicts galaxy rotations without the need for dark matter and without adjustable parameters. Quantised inertia is directly testable in the laboratory, since it predicts that when accelerations are very high the Unruh wavelengths become short enough to be interfered with and so inertial mass may be controllable in a new way. This fits several experimental anomalies that have been seen over the past 30 years and focused lab tests are being set up. Other tests of quantised inertia are possible with highly-accelerated particles in synchrotrons and with simulations of galactic rotation and lensing. Also needed are simulations at the scale of Unruh radiation-matter interactions.

References:

McCulloch, M.E., 2017. Galaxy rotations from quantised inertia and visible matter only. *Astrophys. & Space Sci.*, 362,149. <https://arxiv.org/abs/1709.04918>

McCulloch, M.E., 2013. Inertia from an asymmetric Casimir effect. *EPL*, 101, 59001

McCulloch, M.E., 2007. Modelling the Pioneer anomaly as modified inertia. *Mon. Not. Roy. Astro. Soc.*, 376, 338-342.

**Time:** Monday, 11 June 2018, 14:30

**Venue:** Jülich Supercomputing Centre, Besprechungsraum 1, building 16.3, room 350