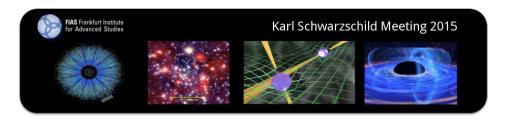
## **Karl Schwarzschild Meeting 2015**



Contribution ID: 55 Type: not specified

## Einstein-Charged Scalar Field Theory: Black Hole Solutions and Their Stability.

Tuesday 21 July 2015 14:00 (20 minutes)

A charged scalar field can be used to extract energy from a charged black hole via superradiant scattering. A mirror-like or AdS boundary could lead the system to an instability. This is because the scalar fields are trapped outside the black hole and repeatedly amplified, there-fore ultimately the back-reaction on the black hole background will become non-negligible.

A charged scalar field on the Reissner-Nordström background with a mirror has been shown to possess a superradiant instability [1]. However the possible end-point of this superradiant instability remains unknown. In this talk, I will consider a fully coupled system consisting of gravity, an electric field and a charged scalar field with a mirror. By solving the field equations, numerical solutions representing charged hairy black holes are obtained. Then I will comment on the stability of these solutions. More details of this work are to appear in

Ref. [2].

## References

[1] Juan Carlos Degollado, Carlos A. R. Herdeiro, and Helgi Freyr R ´unarsson. Rapid growth of superradiant instabilities for charged black holes in a cavity. Phys.Rev., D88:063003, 2013.

[2] Sam Dolan, Supakchai Ponglertsakul, and Elizabeth Winstanley. Article in preparation.

Author: PONGLERTSAKUL, Supakchai

**Co-authors:** Prof. WINSTANLEY, Elizabeth (Consortium for Fundamental Physics, School of Mathematics and Statistics, University of Sheffield); Dr DOLAN, Sam (Consortium for Fundamental Physics, School of Mathematics and Statistics, University of Sheffield)

Presenter: PONGLERTSAKUL, Supakchai

**Session Classification:** Student plenary session 2

Track Classification: Students