

## Critical phenomena and Cosmic Censorship: A semilinear wave model.

Isabel Suárez Fernández<sup>1</sup>, David Hilditch<sup>1</sup>, Rodrigo Vicente<sup>1</sup>,

<sup>1</sup> *Centro de Astrofísica e Gravitação - CENTRA, Departamento de Física, Instituto Superior Técnico - IST, Universidade de Lisboa - UL, Avenida Rovisco Pais 1, 1049-001 Lisboa, Portugal*

We introduce a semilinear model wave equation with discretely self-similar (DSS) threshold solutions lying between dispersion and blow-up. Suitably interpreted, these threshold solutions are unique and solutions nearby in phase space exhibit critical phenomena. The model is constructed by combining the topologists sine curve with an old trick of Nirenberg. The model hence has the special property that the solutions can be written in terms of the solutions of the linear equation. For a given one parameter family of initial data this makes it possible to compute the critical parameter beforehand. Numerical results for this model and modifications not treatable by the same trick will also be presented.

- 
- [1] C. Gundlach and J.M. Martín-García, *Living Reviews in Relativity* **10**, 5 (2007).  
[2] P. Bizo, T. Chmaj, and Z. aw Tabor, *Nonlinearity* **17**, 2187 (2004).  
[3] S. Klainerman, *Communications on pure and applied mathematics* **33**, 41 (1980).  
[4] C. Sogge, *Lectures on Non-Linear Wave Equations* (International Press of Boston, Incorporated, 2013).  
[5] M.W. Choptuik, *Phys. Rev. Lett.* **70**, 9 (1993).