GR 1: Numerical Relativity I

Time: Monday 14:45–15:15 Location: KH 01.016

Invited Talk GR 1.1 Mon 14:45 KH 01.016

Recent Developments on Critical Collapse and Extremality

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The threshold of black hole formation explored by Choptuik in 1993 contains a critical point, a codimension-1 attractor that induces nearby spacetimes to display critical phenomena. In spherical symmetry, this picture is consistent across different configurations, indicating a simple structure of extremely nonlinear spacetimes. However, taking away symmetry restrictions seems to also take away this simplicity. In this talk, I will review current efforts in the numerical relativity community to understand the complicated structure of the threshold beyond spherical symmetry. It is worth noting that, even within spherical symmetry, the critical point is not unique: it can be a naked singularity, as found by Choptuik, a metastable star or, as recent work shows, an extremal black hole. In the talk, I will also discuss the mathematical and numerical efforts undertaken to construct extremal black holes.