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Elastic self-similar collapse

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Critical phenomena in the context of general relativity is a topic that has garnered much interest in the last decades, revealing the laws governing black hole formation in the limit of small mass. To study these phenomena one can start by analyzing collapse solutions located exactly at the threshold of black hole formation, i.e., critical collapse, and apply perturbation methods. Critical collapse solutions for perfect fluids are well known and found to exhibit continuous self-similarity (CSS). In this talk I discuss the critical solutions for elastic matter models, more general, complex and realistic matter models, in spherical symmetry. I show that these solutions also exhibit CSS and how the dynamics vary and are allowed a richer profile as elasticity is introduced and tuned. I also show how elastic behavior directly contributes to the development of shock waves.

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