Abstract Submitted
for the APR08 Meeting of
The American Physical Society

From dimensional analysis to Burgan-Feix transformation: a self-similar and unified analysis EMERIC FALIZE, SERGE BOUQUET, CEA-LUTH — Self-Similar Solutions (SSS) play a key role in physics and astrophysics. They give basic information about physical systems and are an essential complement to numerical simulations. Several approaches, based on properties of invariance, exist and provide many classes of solutions compatible with only specific initial conditions (IC). In order to make sure that solutions be compatible with any boundary and/or IC, Burgan and Feix derived a transformation group - which we name the Burgan-Feix Transformation (BFT) - based upon the concept of partial invariance. The BFT leads also to new solutions through more complex analytical calculations. Including IC in the structure of solutions is very appropriate for High-Energy-Density experiments. In this work, we will propose a progressive approach, from dimensional analysis to BFT, providing SSS containing increasing degree of complexity. Moreover, we will present the theory of the BFT with different point of view.

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Date submitted: 11 Jan 2008 Electronic form version 1.4