

Weakly regular spacetimes with T2 symmetry

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I will present a theory of weak solutions to the Einstein equations under the assumption of T2 symmetry, when the initial data set (imposed in the initial value problem) satisfy certain weak regularity conditions only. I will establish the existence of global foliations whose time function coincide with the area of the orbits of the symmetry group, and then tackle the analysis of the global geometry of these weakly regular spacetimes. To this aim, in papers (written over the past ten years) in collaboration with J.M. Stewart, A.D. Rendall, or J. Smulevici, I have introduced several techniques to deal with weak solutions to the Einstein equations. Interestingly, these spacetimes may exhibit impulsive gravitational waves (a la Khan-Penrose) as well as shock waves. Papers are available at philippefloch.org.