

Merging horizons at Large D

RYOTAKU SUZUKI

Departament de Física Fonamental, Institut de Cències del Cosmos, Universitat de Barcelona, Martí i Franquès 1, E-08028 Barcelona, Spain
Department of Physics, Osaka City University, Osaka 558-8585, Japan

ROBERTO EMPARAN

Institució Catalana de Recerca i Estudis Avançats (ICREA) Passeig Lluís Companys 23, E-08010 Barcelona, Spain
Departament de Física Fonamental, Institut de Cències del Cosmos, Universitat de Barcelona, Martí i Franquès 1, E-08028 Barcelona, Spain

ABSTRACT

The large dimension limit, or *the large D limit*, has greatly helped understanding the dynamics of black holes in higher dimensions analytically. So far, black holes with the *moderately* deformed horizon are well described by *the large D effective theory approach*. On the other hand, the large D analysis with highly deformed horizons, especially, with topology changes was an open question. In this talk, I will show the topology changing solutions are actually described by another type of the large D limit, in which we find that the Ricci-flat double cones found by Barak Kol are extended to much larger regions allowing the match with the entire spacetime. Especially, I demonstrate how the black string and black hole phases are smoothly connected through the pinched phase within the one parameter family of solutions. I will also discuss more general cases, in which the merging horizons are controlled by the Ricci flow equation.