

## Black Hole Microstates in String Theory

**F. Benini<sup>1</sup>, K. Hristov<sup>2</sup>, A. Zaffaroni<sup>3</sup>**

<sup>1</sup>Imperial College, London, UK

<sup>2</sup>Institute for Nuclear Research and Nuclear Energy,  
Bulgarian Academy of Sciences, Sofia, Bulgaria

<sup>3</sup>Universita di MilanoBicocca, Italy

**Abstract.** This talk addresses the problem of counting the black hole microstates within the framework of string theory. The particular example we take are super symmetric asymptotically AdS black holes in four dimensions and our description is in terms of a holographically dual field theory. We focus on a class of asymptotically AdS<sub>4</sub> static black holes preserving two real supercharges which are dual to a topologically twisted deformation of the ABJM theory. We evaluate in the large N limit the topologically twisted index of the ABJM theory and show that it correctly reproduces the entropy of the AdS<sub>4</sub> black holes. An extremization of the index with respect to a set of chemical potentials is required. We interpret it as the selection of the exact Rsymmetry of the superconformal quantum mechanics describing the horizon of the black hole.