“1/4 BPS single center degeneracies from 1/2 BPS degeneracies in N = 4 string theory”

In this talk, I shall present a novel formula to compute the polar degeneracies of 1/4 BPS black holes in 4d theories with N = 4 supersymmetry. I shall go over some of the aspects of wall crossing in N = 4 theories and the underlying number theoretic construction involving (mock)-modular objects. This is an important ingredient in obtaining the 1/4 BPS degeneracies. In comparing these black hole degeneracies of 1/4 BPS states from the microscopic side with the supergravity analysis, one notes a peculiar mismatch of degeneracies for certain polar states - states which control the growth of black hole degeneracies. I shall go over the analysis of such polar states and their counting and present/derive a new formula which computes their degeneracies correctly. I shall comment on the significance of the results obtained from the following perspectives:

a) The ability to count 1/4 BPS states in 4d N = 4 string theory from 1/2 BPS states alone
b) The Nekrasov PF for supergravity localization in the N = 4 theory is a PF of a finite number of worldsheet instantons
c) The computational efficiency of the formula in obtaining single center 1/4 BPS degeneracies