

INDIAN ASSOCIATION FOR THE CULTIVATION OF SCIENCE
2A & 2B, Raja S.C. Mullick Road, Jadavpur, Kolkata-700032, India

Seminar Notice

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School of Physical Sciences

Title:	Re-counting negative discriminant states
Speaker:	Abhishek Chowdhury, School of Basic Sciences, Indian Institute of Technology (IIT), Bhubaneswar, India
Date:	March 13, 2020 (Friday)
Time:	14:30 Hours
Venue:	Physics Seminar Room (C-406), 3rd Floor, Centenary Building, IACS
Abstract:	The degeneracies of single-centered dyonic $1/4$-BPS black holes (BH) in Type II string theory on $K3 \times T^2$ are known to be coefficients of certain mock Jacobi forms arising from the Igusa cusp form. In this paper we present an exact analytic formula for these BH degeneracies purely in terms of the degeneracies of the perturbative $1/2$-BPS states of the theory. We use the fact that the degeneracies are completely controlled by the polar coefficients of the mock Jacobi forms, using the Hardy-Ramanujan-Rademacher circle method. Here we present a simple formula for these polar coefficients as a quadratic function of the $1/2$-BPS degeneracies. We arrive at the formula by using the physical interpretation of polar coefficients as negative discriminant states, and then making use of previous results in the literature to track the decay of such states into pairs of $1/2$-BPS states in the moduli space. Although there are an infinite number of such decays, we show that only a finite number of them contribute to the formula. The phenomenon of BH bound state metamorphosis (BSM) plays a crucial role in our analysis. We show that the dyonic BSM orbits with U-duality invariant negative discriminants are in exact correspondence with the solution sets of the Brahmagupta-Pell equation. We check our formula against the known numerical data arising from the Igusa cusp form, for the first 1650 polar coefficients, and find perfect agreement (https://arxiv.org/abs/1912.06562).

All are cordially invited to attend the seminar