DEPARTMENTAL SEMINAR

Theoretical Sciences

19th MAY, 2022   **4.00PM**   **ONLINE / FERMION**

SPEAKER

Dr. TANMOY PAUL,
Assistant Professor, Chandannagar College, Dept. of Physics

TITLE OF THE TALK

Inflationary magnetogenesis with reheating phase from higher curvature coupling

ABSTRACT

We investigate the generation of magnetic fields from inflation, which occurs via breakdown of the conformal invariance of the electromagnetic (EM) field, when coupled with the Ricci scalar and the Gauss-Bonnet invariant. For the case of instantaneous reheating, the resulting strength of the magnetic field at present is too small and violates the observational constraints. However, the problem is solved provided there is a reheating phase with a non-zero e-fold number. During reheating, the energy density of the magnetic field is seen to evolve as $(a^3H)^{-2}$ and, after that, as a^{-4} up to the present epoch (here a is the scale factor and H the Hubble parameter). It is found that this reheating phase --characterized by a certain e-fold number, a constant value of the equation of state parameter, and a given reheating temperature-- renders the magnetogenesis model compatible with the observational constraints. The model provides, in turn, a viable way of constraining the reheating equation of state parameter, from data analysis of the cosmic microwave background radiation. Moreover we discuss the Schwinger backreaction in the present context and determine the necessary constraints on the reheating equation of state parameter.

HOST FACULTY

Prof. Punyabrata Pradhan and Dr. Sunandan Gangopadhyay
DEPT. OF THEORETICAL SCIENCES
****