



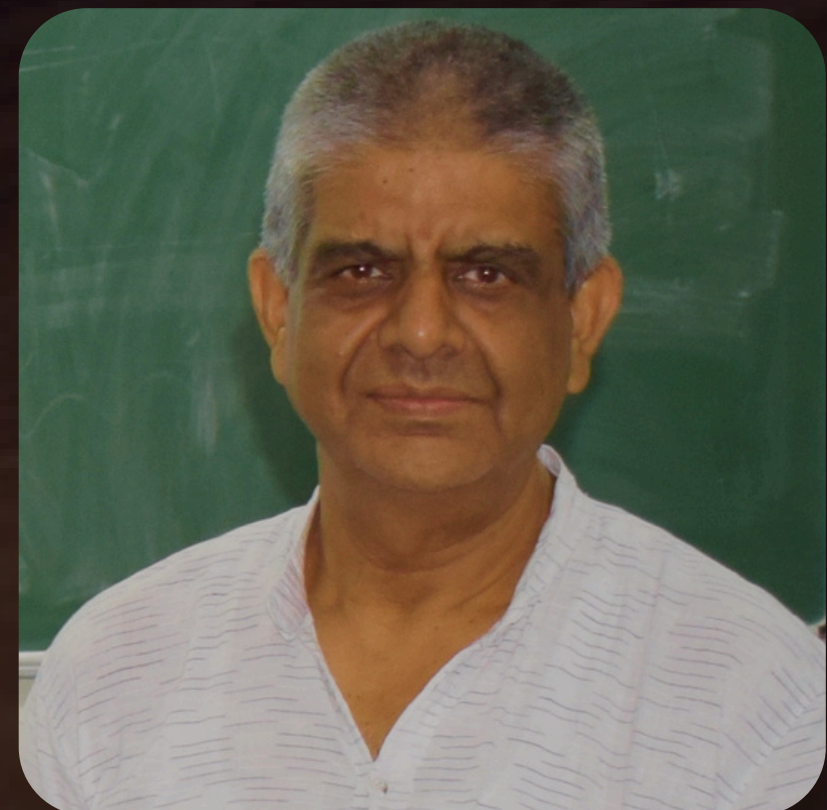
# भारतीय खगोलभौतिकी संस्थान Indian Institute of Astrophysics

## IIA Colloquium

3:30 p.m., Thursday, 20<sup>th</sup> August 2026  
IIA Auditorium

**Prof. Ajit M. Srivastava**

**Raja Ramanna Chair  
Institute of Physics  
Bhubaneswar**



## **Hawking radiation from acoustic black holes in relativistic heavy ion collisions**

Acoustic black holes are formed when a fluid flowing with subsonic velocities accelerates and becomes supersonic. When the flow is directed from the subsonic to supersonic region, the surface on which the normal component of fluid velocity equals the local speed of sound acts as an acoustic horizon. This is because no acoustic perturbation from the supersonic region can cross it to reach the subsonic part of the fluid. One can show that if the fluid velocity is locally irrotational, the field equations for acoustic perturbations of the velocity potential are identical to that of a massless scalar field propagating in a black hole background. One, therefore, expects Hawking radiation in the form of a thermal spectrum of phonons. We discuss this possibility for the case of relativistic heavy-ion collisions where this Hawking radiation should be observable in terms of a thermal component in the rapidity dependence of the transverse momentum distribution of detected particles. We also discuss the case of hydrodynamic flow of electrons in condensed matter systems where the resulting Hawking radiation will appear in terms of current fluctuations.

High Tea at auditorium lounge at 3:00 p.m.

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