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**SHARMILA GUNASEKARAN**, University of Alberta

*Slow decay of waves in gravitational solitons*

Gravitational solitons are globally stationary, horizonless asymptotically flat spacetimes with positive energy. Typically they arise as classical solutions to the supergravity theories. In this talk, I will address their stability at the simplest level by investigating solutions to the linear wave equation in a particular soliton spacetime. I will describe a methodology, introduced by Holzegel-Smulevici to prove that massless scalar waves in this family of soliton spacetimes cannot decay faster than inverse logarithmically in time. The proof involves the construction of quasimodes which are approximate solutions to the wave equation. This slow decay can be attributed to the stable trapping of null geodesics and is suggestive of instability at the nonlinear level. This is joint work with Hari Kunduri.