Department of Mathematics and Statistics Colloquium

Rain, Hail, and Drip Frames of the Schwarzschild-de Sitter Geometry

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Abstract: The Schwarzschild spacetime geometry is the unique vacuum spherically symmetric solution of the Einstein equations of general relativity, and is used to model many sources of gravity, from planets to stars to black holes. Many coordinate systems for this geometry have appeared in the literature. Subsets of these coordinate systems are associated with observers moving inwardly along radial geodesics of this geometry. Such observers have been categorized as being in the "rain" frame, a "hail" frame, or a "drip" frame. This framework naturally progresses into a search for counterparts of these coordinate systems for other spacetime geometries. Notable examples include the geometry corresponding to a cosmological constant, de Sitter (dS) spacetime, and the spacetime that combines a spherical source with a cosmological-constant background, known as the Schwarzschild-de Sitter (SdS) spacetime. We find coordinate systems for the SdS geometry that turn out to differ from the naïve extrapolations of the Schwarzschild and dS geometries.

Friday, November 5th at 3:10 pm via Zoom