McMaster University   University of Toronto   University of Waterloo

THE FIELDS INSTITUTE FOR RESEARCH IN MATHEMATICAL SCIENCES

GEOMETRIC MECHANICS SEMINARS

SPEAKER:

MARCUS KRIELE
The Fields Institute and University of Waterloo

On the Topic:

"Geodesics in Type Changing, Psuedo Riemannian Manifolds"

We consider manifolds with smooth pseudo Riemannian metric which changes bilinear type at a hypersurface. An example is a metric that is degenerate at a hypersurface which divides a Riemannian region from a Lorentzian region. In this talk we identify all those geodesics and pregeodesics which cross the hypersurface of type change transversely. It turns out that these (pre)geodesics are constrained considerably. If time permits we give also an existence and uniqueness theorem for the type changing eikonal partial differential equation using symplectic techniques.

Apart from the mathematical interest such metrics are now of interest as a semiclassical approximation of the very early universe. In the context of cosmology this makes it possible to construct an absolute time function without (locally) breaking the Lorentzian symmetry of spacetime. *(Joint work with Marek Kossowski).*

Tuesday, April 13, 1993

3:30 pm, room 3018

at

The Fields Institute