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HAROLD J GAY LECTURE SERIES

PDEs and Fractals

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From Collisionless Shocks to Integrable Systems

Wednesday, 11:00 am
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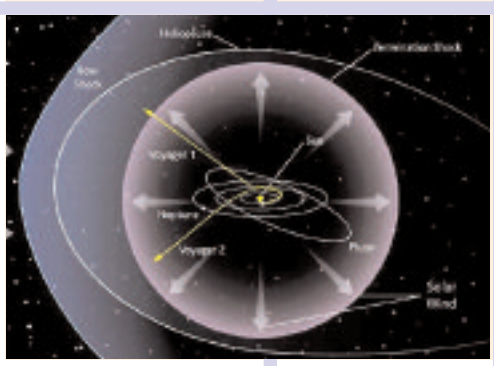
Salisbury Labs 104

ABSTRACT **Collisionless shocks have been studied twice. First in the 1950s they were proposed as a mechanism for heating up a controlled nuclear fusion machine for creating energy. But their mathematical structure was an open question. Now such a shock has been observed by Voyager 2 in its travels through space. The lecture will first describe how collisionless shocks occur in the solar system. Then we will examine in a simple model what we mean mathematically by a collisionless shock and why its structure is a puzzle. Finally we look at how these investigations led to the study of completely integrable systems of partial differential equations.**

Geometry with its applications has been at the heart of the development of partial differential equations and boundary value problems since the very beginning. In physics, biology, economics, and other applied fields, a variety of new problems are now emerging that display unusual geometrical, analytical and scaling features, possibly of fractal type. The objective of these lectures is to acquire the view of outstanding mathematicians on the subject of differential equations and fractals, and their developments and applications, in a broad perspective encompassing both classical highlights and contemporary trends.



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Participation of faculty and students is most welcome

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