



Professor Cathleen Morawetz is a Fellow of the American Association for the Advancement of Science, the American Academy of Arts and Sciences, and National Academy of Sciences. She was the Director of the Courant Institute of Mathematical Sciences, and the President of the American Mathematical Society. She received her National Medal of Science in 1998, and the Lifetime Achievement award from the American Mathematical Society in 2004.

4:30-5:30p.m.
Friday
April 6, 2007
 Auditorium 125
 Frick Fine Arts
 Building

Free and Open
to the Public

**The University of Pittsburgh
 Department of Mathematics**

presents

**The Edmund R. Michalik
 Distinguished Lecture in
 the Mathematical Sciences**

Dr. Cathleen Morawetz

*Courant Institute of Mathematical Sciences
 New York University*

*Collisionless Shocks
 in Space*

ABSTRACT: In the last century plasma physics led to the general theory of magnetohydrodynamics. But the meaning of shocks when the mean free path of the particles is very large was left open. Such shocks have been studied twice. First in the 1950s they were proposed as a mechanism for heating a controlled nuclear fusion machine for creating energy. Now such a shock has been observed by Voyager 2 in its travels through space. The lecture will describe how collisionless shocks occur in the solar system and why its structure is a puzzle.

**Reception immediately
 following the Lecture**
 The Cloisters
 Frick Fine Arts Building

This public lecture is part of an annual series in honor of Professor Edmund R. Michalik, established through a gift from the Michalik family.

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