1046-83-1727   **Niky Kamran***, Department of Mathematics and Statistics, McGill University, 805 Sherbrooke Street West, Montreal, Quebec H3A 2K6, Canada. *The Penrose process and the wave equation in Kerr geometry.*

We shall review the Penrose process for extracting mass and angular momentum from the Kerr black hole solution of the Einstein equations. We will show that Christodoulou's bound on the maximal energy gain by the classical Penrose process can be realized by choosing suitable wave packet initial data for the scalar wave equation in Kerr geometry, thereby putting super-radiance on a rigorous mathematical footing. This is joint work with Felix Finster, Joel Smoller and Shing-Tung Yau. (Received September 16, 2008)