1092-76-377   **Tian Ma** and **Shouhong Wang*** (`showang@indiana.edu`), Rawles Hall 332, Indiana University, Bloomington, IN 47405. *Interplay between Mathematics and Physics.*

In this talk, we present two examples demonstrating the symbiotic interplay between modern mathematics and physics. The first example is the dynamics of fluid flows, leading a new dynamical transition theory. The second example is on the introduction of two physical principles—the principle of interaction dynamics (PID) and the principle of representation invariance (PRI), leading a complete new avenue for field theory and particle physics. We shall focus on the mathematical and physical significances of these two principles. (Received August 13, 2013)