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**Ramjee Sharma\*** (rsharma@devry.edu), DeVry University, One West Court Square, Decatur, GA 30030. *Modeling the 2d surface quasigeostrophic equations from the Euler equations.*

The inviscid 2d quasigeostrophic equation is given by

$$\partial_t \theta + u \cdot \nabla \theta = 0, \nabla \cdot u = 0,$$

where  $\theta = \theta(x, t)$  is a scalar and  $u$  is the velocity field given by the stream function  $\psi$  through the following relation  $u = \nabla^\perp \psi$ , and  $(-\Delta)^{1/2} \psi = \theta$ . This is one of the outstanding open problems in non linear partial differential equations. In this talk we will present numerical and analytic aspects of a model equation that connects the 2d quasigeostrophic equations and 2d Euler equation. Since we already know the solution of 2d Euler equation, our results will help understand some important aspects of the unsolved mystery of 2d quasigeostrophic equations. We will also present similarities between 2d quasigeostrophic equations and 3d Euler equation. (Received September 16, 2014)