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Chongsheng Cao and **Aseel Farhat*** (afarhat@math.uci.edu), afarhat@math.uci.edu, and
Edriss S. Titi. *On the Global Well-posedness of a Simplified Reduced Rayleigh-Bénard Convection Model.*

In plasma physics, the 3D Hasegawa-Mima equation is one of the most fundamental models that describe the electrostatic drift waves. In the context of geophysical fluid dynamics, the 3D Hasegawa-Mima equation appears as a simplified model of a reduced Rayleigh-Bénard convection model that describes the motion of a fluid heated from below. Investigating the 3D Hasegawa-Mima model is challenging even though the equations look simpler than the 3D Euler equations. Inspired by these models, we introduce and study a simplified mathematical model that has a nicer mathematical structure. We prove the global existence and uniqueness of solutions of the 3D simplified model as well as a continuous dependence on the initial data result. These results are one of the first results related to the 3D Hasegawa-Mima equation. (Received September 22, 2011)