

Abstract Submitted  
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**Unmixed islands in quasi-periodically-driven flows**<sup>1</sup> HOPE WEISS,  
ANDREW SZERI, UC Berkeley — Nested invariant 3-tori surrounding a torus braid  
of elliptic type are found to exist in a quasi-periodically forced fluid flow. The Hamil-  
tonian describing this system is given by the superposition of two steady stream  
functions, one with an elliptic fixed point and the other with a coincident hyper-  
bolic fixed point. The superposition, modulated by two incommensurate frequencies,  
yields an elliptic torus braid at the location of the fixed point. The system is sus-  
pended in a four-dimensional phase space (two space and two phase directions). To  
analyze this system we define two three-dimensional, global, Poincaré sections of  
the flow. The coherent structures (cross-sections of nested 2-tori) are found to each  
have a fractal dimension of two, in each Poincaré cross-section. This framework has  
applications to tidal and other mixing problems of geophysical interest.

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