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Dynamics of Volume-Preserving Maps near a Saddle-Node-Hopf Bifurcation. Preliminary report.

The study of the dynamics of volume-preserving maps has applications to mixing in fluids and transport in strongly magnetized plasmas. We study the dynamics for maps near to a map with fixed point with multiplier one. In particular we obtain the normal form unfolding the triple-one multiplier. We find parameter regions for which there is a “bubble” of bounded orbits consisting of an invariant circle, surrounded by a cantor-family of invariant tori and bounded by a heteroclinic tangle between a pair of saddle fixed points. Such bubbles are also created in resonant bifurcations of the invariant circle. (Received July 08, 2007)