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Lauren R. Johnson* (lrjohns7@asu.edu), 3031 E. Bighorn Ave., Phoenix, AZ 85048, and **Lee M. Burke, Chris Barton** and **Mohamed Moustaoi**. *Stability and accuracy analysis for a novel semi-implicit leapfrog time-stepping scheme.*

A new time stepping scheme is proposed. It is based on the semi-implicit method and the leapfrog method with a fourth-order time filter. The scheme is implicit and requires only one evaluation per time step. We test the order and stability of the scheme by applying it to the wave equation. Comparisons are made with the standard Robert-Asselin filtered leapfrog scheme and with the explicit leapfrog scheme with a fourth-order time filter, using filter coefficients that damp the computational $2\Delta t$ modes at the same rate. We will show that the proposed scheme improves the resolution of the physical modes, increases the zone of stability compared to the traditional time-filtered leapfrog schemes, and damps the computational modes. This new method is an attractive candidate for atmospheric, oceanic, and climate modeling. (Received September 16, 2013)