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Global stability of cosmological fluids with extreme tilt

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In cosmology, the equation of state of a perfect fluid is considered to be p = c_sˆ2 \rho, where c_s is the speed of sound. The simplest solution to the Einstein-Euler system, known as FLRW, representing a cosmological fluid, was discovered by Friedmann already in 1922. There is an extensive literature in physics concerning the dynamics of cosmological fluids. However, rigorous mathematical works proving the stability of homogeneous backgrounds are so far restricted to small sound speeds, up to the radiation threshold. Interesting bifurcation phenomena and instabilities are predicted for larger sound speeds. I will discuss joint work with E. Marshall and T. A. Oliynyk proving the global stability of homogeneous solutions with so-called extreme tilt, whose fluid vector field becomes asymptotically null, beyond the radiation case.

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