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# Stochastic shear in bouncing cosmologies

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Bouncing cosmologies is a popular alternative to (or an extension of) primordial inflation. However, the contracting phase preceding the bounce is known to be flawed with a shear instability with important consequences on the fate of the bouncing universe. Depending on the concrete model, this instability could either prevent the bounce to occur or drive the universe in an expanding phase radically different from the observed one. I will show that even in the absence of initial shear, quantum fluctuations of the matter content lead to a non-zero anisotropic stress. This unavoidable anisotropic stress is stochastic by nature and sources a non-zero shear. The amount of stochastic shear built up by quantum fluctuations is computed considering the simple situation of a massless scalar field and using the stochastic « inflation » formalism to describe its quantum fluctuations. I'll show that for a soft equation-of-state, i.e. w>-1/9, the shear contribution remains small enough up to the bounce and there is no additional source of shear instability. However, for w<-1/9, the shear backreaction becomes non-negligible because quantum fluctuations in that case have a spectrum which is too red.

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