Ministry of Science and Higher Education
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Axial gravitational waves in FLRW cosmology and memory effect

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We show exemplary initial metrics for gravitational axial waves, that are twice differentiable but which are not C^2. They generate wave pulses that interact with matter in the radiation cosmological era. This forces the radiation matter to rotate. This rotation is permanent - it persists after the passage of the gravitational pulse. In contrast to that, we explicitly show that a class of smooth initial metrics that are at least C^2 gives rise to gravitational wave pulses that do not interact with the background during the radiation epoch.

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