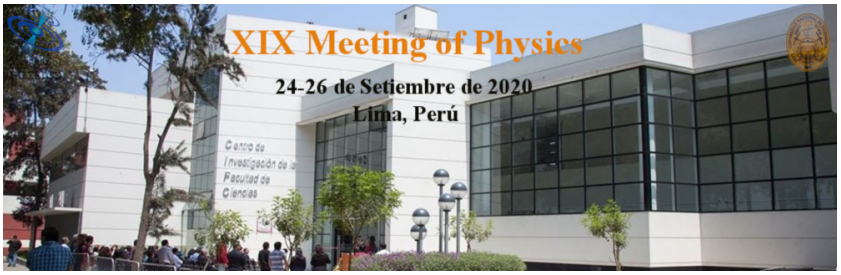

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Universe in a black hole with spin and torsion

Friday, 25 September 2020 11:00 (30)

The conservation law for the total (orbital and spin) angular momentum of a Dirac particle in the presence of gravity requires that spacetime is not only curved, but also has a nonzero torsion.
The coupling between the spin and torsion in the Einstein-Cartan theory of gravity generates gravitational repulsion at extremely high densities.
We consider gravitational collapse of a spin-fluid sphere into a black hole.
We show that a singularity is replaced with a nonsingular bounce if there is no shear.
We also show that torsion and quantum particle production during contraction avoid a singularity even if shear is present.
Particle production during expansion can generate a finite period of inflation and produce enormous amounts of matter.
The resulting closed universe on the other side of the event horizon may have several bounces.
Such a universe is oscillatory, with each cycle larger in size then the previous cycle, until it reaches the cosmological size and expands indefinitely.
Our universe might have therefore originated from a black hole.

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