

1126-83-33

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The Geometry of Special and General Relativity.

General relativity can be described in three words: “Matter curves spacetime.” But what is spacetime, and how does matter curve it? Amazingly, the answer to this question leads to the prediction for the big bang and black holes, noted by mathematicians before either phenomenon was observed by astronomers. Furthermore, natural geometric ideas, like minimal surfaces and scalar curvature, correspond to physical notions like black holes and energy density, allowing us to prove theorems with both geometric and physical interpretations. (Received December 12, 2016)