

Shapes and a Dynamical Arrow of Time

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I will show that if the philosophically dubious absolute elements which Newton introduced when he created dynamics are eliminated, his theory of gravity applied to a model universe leads to a theory of time and its arrow that is a direct consequence of Newton's laws. The arrow, which does not arise from a special condition of low entropy in the early universe that must be imposed in addition to the dynamical laws, points in the direction of increasing order and not, as widely believed on the basis of the second law of thermodynamics, entropic disorder. I will also draw attention to the dramatic change of perspective that results from the recognition that no ruler exists outside the universe to measure its size. Only the shape of the universe is physically meaningful. Since from the point of view of group theory Newton's and Einstein's theories of gravity have the same architectonic structure, these Newtonian features may well be true of our universe described by Einstein's theory.

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