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# Extended-body motion, local symmetries, and Petrov types

*Friday, 7 July 2023 10:00 (20 minutes)*

To a first approximation, objects in general relativity move along geodesics. Looked at more closely, a body's internal structure affects its motion, causing different objects to fall in different ways. This talk will explore which extended-body effects are possible and which are not. For example, can an appropriately-engineered spacecraft escape from a bound orbit without the use of a rocket? Indeed it can. There are constraints, however. It has long been known that Killing fields provide some such constraints. This talk nevertheless introduces a much weaker notion of symmetry which constrains extended-body effects. This includes Killing fields, conformal Killing-Yano tensors, and more. Many of the relevant constraints depend on the algebraic structure of the Weyl tensor (i.e., the Petrov type), and this is discussed as well.

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