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Methods for measuring and transporting angular momentum in general relativity DAVID NICHOLS, EANNA FLANAGAN, Cornell University, LEO STEIN, Caltech, JUSTIN VINES, Albert Einstein Institute — For an observer in a curved spacetime, elements of the dual space of the set of linearized Poincare transformations from the observer's tangent space to itself can naturally be interpreted as local linear and angular momenta. We give an operational procedure by which the observer can measure such local linear and angular momenta from the local spacetime geometry. These momenta can be interpreted as approximate versions of the linear and angular momenta of the spacetime about the observer's location. The measurement algorithm allows for a more accurate determination of the linear and angular momentum of stationary, asymptotically flat systems than previous proposals do. We also describe a prescription by which observers at different locations can compare values of their measured linear and angular momentum by using a specific transport equation, which refines previous proposals. These operational definitions may also prove useful for clarifying the physical interpretation of Bondi-Metzner-Sachs asymptotic charges in asymptotically flat spacetimes.

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