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Operational interpretation of the G-asymmetry for Abelian groups[1] MICHAEL SKOTINIOTIS, GILAD GOUR, University of Calgary — In a reference frame alignment protocol the sender, Alice, prepares a quantum system in a state $ket\psi$, that serves as a token of her reference frame, and sends this system to a receiver, Bob, who performs a measurement and learns about the reference frame. We derive the state and measurement that maximize the accessible information in a reference frame alignment protocol. We show that in the limit where a large number of systems are sent, the accessible information per copy equals the Holevo bound. The latter was shown to be equal to the relative entropy of frameness, or G-asymmetry, of the state $ket\psi$, a measure of resourcefulness analogous to the relative entropy of entanglement. We show that for a reference frame alignment protocol, associated with a finite abelian group, Z_N, or the continuous group $U(1)$, associated with the important case of photon number super-selection, the rate of accessible information is quantified by the linearized, regularized G-asymmetry. Our result provides an information theoretic operational interpretation for the G-asymmetry that has been thus far lacking.

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