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Symmetry induced non local currents, an application in anyon statistics GEORGIOS GOUNARIS, University of Pennsylvania, FOTIOS DIAKONOS, University of Athens — The use of symmetries is in the core of physics, playing a fundamental role in the theoretical treatment of any system. In this particular study we will examine the role of symmetry in the description of anyon statistics. We introduce the concept of non-local currents, which can be defined for potentials which are invariant under symmetry transformations and correlate the values of the wavefunction in symmetry related spatial domains. These currents occur pairwise and one member of the pair acts as an order parameter for symmetric systems being zero when the system is in an eigenstate of the corresponding symmetry transform and non-zero otherwise. The other member defines an operator carrying the information of the eigenvalue of the operator describing the associated symmetry transform when its partner vanishes. We take advantage of that property by applying this method in a 2-D highly symmetric system of two interacting anyons. We will prove by working in the anyon gauge that the eigenvalue of the mapping operator is the non trivial statistical phase of the anyons. To obtain this result no further assumptions are needed. This points out the importance of the symmetry as a general tool to treat the statistics of composite particles.

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