

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Long-range spin-coupled interactions: a *Gedankenexperiment* on the nature of spin IAN DURHAM, Saint Anselm College — What is intrinsic spin? It is at the heart of the quantum information revolution and yet it defies many of the efforts to better understand it, even to the point of pushing particle physics beyond the Standard Model. Long assumed to require the relativistic theory of Dirac, in 1967 Lévy-Lablond demonstrated that this was not the case: it is not necessarily a relativistic effect. In this article, we apply the Lévy-Lablond model to a simple *Gedankenexperiment* that suggests the existence of a quasi-fundamental long-range spin-coupled interaction. Calculations of the eigenfunctions of a test particle and the coupling constant of the force gives insight into the behavior of the potential that gives rise to this interaction. For large separation distances the potential looks like a simple potential well while for very small separation distances it exhibits a more complex nature. This, in turn, sheds additional light on the nature of intrinsic spin and suggests a path for future research.

Ian Durham
Saint Anselm College

Date submitted: 18 Nov 2010

Electronic form version 1.4