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Solitonic Models Based on Quantum Groups and the Standard Model

The idea that the elementary particles might have the symmetry of knots has had a long history. In any current formulation of this idea, however, the knot must be quantized. The present review is a summary of a small set of papers that began as an attempt to correlate the properties of quantized knots with the empirical properties of the elementary particles. As the ideas behind these papers have developed over a number of years the model has evolved, and this review is intended to present the model in its current form. The original picture of an elementary fermion as a solitonic knot of field, described by the trefoil representation of $SU_q(2)$, has expanded into its current form in which a knotted field is complementary to a composite structure composed of three or more preons that in turn are described by the fundamental representation of $SL_q(2)$. These complementary descriptions may be interpreted as describing single composite particles composed of three or more preons bound by a knotted field.

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