Heisenberg and Bethe field extensions applied to magnetic rings

<u>G. Banaszak</u>,[1] D. Blinkiewicz,[1] P. Krasoń,[2] and J. Milewski[3]

[1]*Department of Mathematics and Computer Science,*
Adam Mickiewicz University, Poznań 61-614, Poland
[2]*Department of Mathematics and Physics,*
Szczecin University, 70-415 Szczecin, Poland
[3]*Institute of Mathematics, Poznań University of Technology,*
ul. Piotrowo 3A, 60-965 Poznań, Poland

We consider striking connections between the theory of homogenous isotropic Heisenberg ring (XXX-model) and algebraic number theory. We explain the nature of these connections especially applications of Galois theory for computation of the spectrum of the Heisenberg operators and Bethe parameters. The solutions of the Heisenberg eigenproblem and Bethe Ansatz generate interesting families of algebraic number fields. Galois theory yields additional symmetries which not only simplify the analysis of the model but may lead to new applications and horizons.