

Grahovski, Georgi G.; Gerdjikov, Vladimir S.; Kostov, Nikolay A.; Atanasov, Victor A.
New integrable multi-component NLS type equations on symmetric spaces: \mathbb{Z}_4 and \mathbb{Z}_6 reductions. (English) [Zbl 1101.35070](#)

Mladenov, Ivaïlo (ed.) et al., Proceedings of the 7th international conference on geometry, integrability and quantization, Sts. Constantine and Elena, Bulgaria, June 2–10, 2005. Sofia: Bulgarian Academy of Sciences (ISBN 954-8495-30-9/pbk). 154-175 (2006).

Summary: The reductions of the multi-component nonlinear Schrödinger models related to C.I and D.III type symmetric spaces are studied. We pay special attention to the MNLS related to the $\mathfrak{sp}(4)$, $\mathfrak{sp}(10)$ and $\mathfrak{so}(12)$ Lie algebras. The MNLS related to $\mathfrak{sp}(4)$ is a three-component MNLS which finds applications to Bose-Einstein condensates. The MNLS related to $\mathfrak{so}(12)$ and $\mathfrak{so}(10)$ Lie algebras after convenient \mathbb{Z}_6 or \mathbb{Z}_4 reductions reduce to three and four-component MNLS showing new types of $\chi^{(3)}$ -interactions that are integrable. We briefly explain how these new types of MNLS can be integrated by the inverse scattering method. The spectral properties of the Lax operators L and the corresponding recursion operator Λ are outlined. Applications to spinor model of Bose-Einstein condensates are discussed.

For the entire collection see [\[Zbl 1089.53004\]](#).

MSC:

- 35Q55** NLS equations (nonlinear Schrödinger equations)
- 37K30** Relations of infinite-dimensional Hamiltonian and Lagrangian dynamical systems with infinite-dimensional Lie algebras and other algebraic structures
- 82B10** Quantum equilibrium statistical mechanics (general)

Cited in **3** Documents

Keywords:

Lie algebras; Bose-Einstein condensates; Lax operators

Full Text: [arXiv](#)