Automorphic Lie algebras

S. Lombardo[1], and J. A. Sanders[2]
[1]Department of Mathematics and Information Sciences
Northumbria University, Newcastle upon Tyne, UK
[2]Department of Mathematics,
Vrije Universiteit, Amsterdam, The Netherlands
sara.lombardo@northumbria.ac.uk

Automorphic Lie Algebras are Lie algebras tensored with homogeneous functions of the spectral parameter, such that the elements are invariant under the combined action of a Platonic group acting via two irreducible representations on both the original simple Lie algebra and the spectral parameter (e.g. [1], [2]). They have been introduced in the context of algebraic reduction of integrable systems (Lax pairs), but they turn out to be very interesting in their own right, they show much more structure than originally anticipated and they can be described almost completely independent of the chosen group. The presence of a modular invariant complicates the analysis of the structure theory along the lines of the classical classification theory of complex Lie algebras, but final results are now becoming visible and this talk will report on the latest developments [3].

References

[1] S. Lombardo and A. V. Mikhailov: Reduction Groups and Automorphic Lie Algebras, *Communications in Mathematical Physics* 258, 179-202 (2005)

[2] S. Lombardo and J. A. Sanders: On the classification of Automorphic Lie Algebras, *Communications in Mathematical Physics* 299, 793-824 (2010)

[3] S. Lombardo and J. A. Sanders: Higher dimensional Automorphic Lie Algebras, in preparation