

BOSTON UNIVERSITY GEOMETRY AND PHYSICS SEMINAR

**FROM LIE ALGEBRAS AND POISSON  
BRACKETS TO DRINFELD DOUBLES: AN  
APPROACH BASED ON SUPERGEOMETRY**

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Oct 10, 2012, 4:00 – 5:00pm  
Math/Computer Science, Room B21  
111 Cummington Street, Boston

Tea: 3:45pm in Room 144

**Abstract:** In the talk, I will try to show how the language of supermanifolds and graded manifolds (which are a version of supermanifolds with an extra grading in the structure sheaf) is helpful for describing algebraic and differential-geometric structures, such as Poisson brackets, Lie algebras and Lie algebroids, Lie bialgebras and Lie bialgebroids, etc. This language not only clarifies certain notions that are not very obvious in the conventional description (e.g., morphisms of Lie algebroids or L-infinity morphisms of L-infinity algebras), but suggests correct constructions where the answer was not known by other methods. An example is 'Drinfeld classical double' for Lie bialgebroids.

In particular, I will explain an equivalence between two constructions of a 'double' for Lie bialgebroids, namely, the 'cotangent double' due to Mackenzie and the 'supergeometric double' due to Roytenberg. They are united with the help of the notion of a double Lie algebroid, introduced originally by Mackenzie and later substantially clarified by the speaker using methods of supergeometry. (Double Lie algebroids are related with the categorical notion of double objects in the sense of Ehresmann. The appearance of such an object as a 'Drinfeld double' is an unintended pun.)

This is a survey talk and I will not assume prior knowledge of supergeometry.

See <http://math.bu.edu/research/geom/seminar.html> or contact Si Li [sili@math.bu.edu](mailto:sili@math.bu.edu) for more information.