

## The principal semisimple element and teeny-weeny representations

The principal  $\mathfrak{sl}_2$  is an object of importance in the understanding of the structure of simple Lie algebras.

In this talk we will address the question when an irreducible subalgebra contains the semisimple element of a principal  $\mathfrak{sl}_2$  and give a classification result for those subalgebras. We will also explain the motivation of that question coming from Higgs bundles and representations of fundamental groups of Kähler manifolds.

The classification is based of the understanding of “teeny-weeny” representations of a Lie algebra, i.e. representations all of whom nonzero weight spaces are one dimensional. We will also give a classification result for those representations.

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