THE CENTRAL SPHERE OF AN ALE SPACE

SPEAKER: Nigel Hitchin (University of Oxford)

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ABSTRACT: ALE spaces are hyperkähler 4-manifolds which were constructed by Kronheimer as hyperkähler quotients. For certain values of the parameters they have a circle action with a distinguished 2-sphere which is pointwise fixed. The underlying aim is to find explicitly the metric on this sphere but the talk will also focus on the parallels with the Higgs bundle moduli space, where the moduli space of stable bundles is the analogue of the 2-sphere. The sphere is a holomorphic curve in complex structure I but a compact real form of an affine algebraic surface in complex structure J. The full resolution of the Kleinian singularity is the analogue of the nilpotent cone. A key example is the D4 singularity where the algebraic surface is a cubic and the 27 lines play a role in describing the metric.