

Scientific Report: H.W. Braden.

Visit to SISSA: August 31-September 15, 2008.

Purpose of Visit: To further develop the finite gap integration of monopole systems in the context of cyclically symmetric monopoles.

Main Results Obtained: Substantial progress was made pertaining to cyclically symmetric monopoles with three related results:

- The ansatz of Sutcliffe which shows that solutions of the a_{n-1} affine Toda equations yield solutions of the Nahm equations was shown to be necessary supposing a charge n $su(2)$ monopole possesses a cyclic symmetry of order n . This employed various Lie algebra structure results.
- The Ercolani-Sinha vector of the genus $(n-1)^2$ spectral curve was shown to reduce to the Ercolani-Sinha vector of the genus $(n-1)$ affine Toda spectral curve. The significance of this is that a vector in the Jacobian of the affine Toda integrable system reproduces the Nahm flow on the Jacobian of the monopole spectral curve.
- Perhaps the nicest of the results is that a natural point on the affine Toda Jacobian lifts to the special point describing monopole flows on the Jacobian of the monopole spectral curve. This means that the study of cyclically symmetric monopoles reduces to the study of particular solutions of the affine Toda equations.

These results were described at the MISGAM meeting *From Integrable Structures to Topological Strings and back* during the latter part of my visit. Several discussions made at that meeting may well lead to future collaboration. These together with discussion with various SISSA staff proved interesting.

Projected Publications: These results will be published in due course and acknowledgment made of the MISGAM support given as well as the hospitality of SISSA.

Other Comments: I have again enjoyed the the hospitality and efficiency of SISSA staff.