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## A Talk at the 2nd ISNMP Conference

Bad Ems, 28 June to 4 July 2026

### Regular Session:

**Speaker:** Da-jun Zhang (Shanghai University, P.R. China)

**Collaborators:** Xing Li, Ying-ying Sun

**Title:** *The GLM equation and direct linearisation structure related to the Lamé function*

**Abstract:** We will establish an elliptic direct linearization (DL) scheme for the KP equation. The scheme consists of an integral equation involving the Lamé function. A formula for elliptic soliton solutions is confirmed in this scheme by checking Lax pair of the KP. Based on analysis of real-valuedness of the Weierstrass functions, we are able to construct a GLM equation for elliptic solitons for the KP equation. By utilizing elliptic  $N$ th roots of unity and reductions, the elliptic DL schemes, GLM equations and nonsingular real solutions can be obtained for the KdV equation and Boussinesq equation. The paper is based on a joint work with Xing Li and Ying-ying Sun: *Nonlinearity*, 38 (2025) No.105024 (arxiv:2501.06476).