

# Painlevé Integrability and Abundant Localized Structures of (2+1)-dimensional Higher Order Broer-Kaup System

Ji Lin<sup>a,b</sup> and Hua-mei Li<sup>b</sup>

<sup>a</sup> Physics Department, Shanghai Jiao Tong University, Shanghai, 200030, China

<sup>b</sup> Department of Physics, Zhejiang Normal University, Jinhua 321004, China

Reprint requests to J. L.; E-mail: jhlinji@mail.jhptt.zj.cn

Z. Naturforsch. **57 a**, 929–936 (2002); received August 5, 2002

It is proven that the (2+1) dimensional higher-order Broer-Kaup system possesses the Painlevé property, using the Weiss-Tabor-Carnevale method and Kruskal's simplification. Abundant localized coherent structures are obtained by using the standard truncated Painlevé expansion and the variable separation method. Fractal dromion solutions and multi-peakon structures are discussed. The interactions of three peakons are investigated. The interactions among the peakons are not elastic; they interchange their shapes but there is no phase shift.

*Key words:* Painlevé Analysis; Variable Separation Method; Fractal Dromion Solution; Peakon Structure.