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Jacek Szmigielski* (szmigiel@math.usask.ca), Department of Mathematics and Statistics, University of Saskatchewan, 106 Wiggins Road, Saskatoon, SK S7N 5E6, Canada. *Multipeakons in the Degasperis-Procesi Equation I*. Preliminary report.

Peakons are singular solutions to nonlinear wave equations whose dynamics can be studied using ordinary differential equations (ODEs). When the underlying nonlinear partial differential equations (PDEs) are integrable the study of peakons can be greatly enhanced by the use of isospectral deformations techniques. Degasperis-Procesi equation (DP) is an integrable PDE exhibiting wave-breaking which, in the peakon sector, can be interpreted as a mechanical collision of particles (multipeakons) described by a system of ordinary differential equations. The multipeakon solution exhibits an intricate dynamics which is nontrivially correlated with the spectral properties of an accompanying boundary value problem. This talk is the first of two talks on the topic of DP multipeakons, the second talk to be given by Lingjun Zhou (Tongji University, Shanghai, China). In the first talk I will describe the forward and inverse problems that accompany multipeakon solutions. I will discuss a few more intricate aspects of the problem such as the correlation between the existence of the asymptotic (in time) dynamics and the underlying reality of the spectrum of the boundary value problem. This is joint work with Lingjun Zhou. (Received September 17, 2011)