Westfälische
Wilhelms-Universität
Münster

Mathematische Institute der WWU – Kolloquium Wilhelm Killing

Singularities of axisymmetric flows with gravity

Professor Georg Weiss (Universität Düsseldorf)

03.05.2012, 16:30 Uhr, Hörsaal M 5

We consider a steady axisymmetric solution of the Euler equations for a fluid (incompressible and with zero vorticity) with a free surface, acted on only by gravity. We analyze stagnation points as well as points on the axis of symmetry. At *stagnation points* on the axis of symmetry, the unique blow-up profile consistent with the invariant scaling of the equation is *Garabedian's pointed bubble solution* with water above air. Thus at stagnation points on the axis of symmetry with no water above the stagnation point, the invariant scaling of the equation cannot be the right scaling. A fine analysis of the blow-up velocity yields that in the case that the surface is described by an injective curve, the velocity scales almost like $\sqrt{X^2 + Y^2 + Z^2}$ and is asymptotically given by the velocity field

$$V(\sqrt{X^2 + Y^2}, Z) = c(-\sqrt{X^2 + Y^2}, 2Z)$$

with a nonzero constant c.

Tee wird ab 16:00 Uhr im Sitzungszimmer SR 0 des Mathematischen Instituts serviert.

Fachbereich 10
Mathematik und Informatik
http://wwwmath.uni-muenster.de