Global almost radial solutions to supercritical dispersive equations outside the unit ball

Piero D'Ancona
Dipartimento di Matematica - Sapienza, Università di Roma - P.Moro 2 - 00185 Roma (Italy)
dancona@mat.uniroma1.it

I consider a defocusing semilinear wave equation with power nonlinearity, on the exterior of the unit ball, with Dirichlet boundary conditions, in dimension $n \geq 3$. For any radial initial data, the solution is global and decays as t^{-1}. I prove that the radial solutions are stable for small perturbations of the initial data in a weighted Sobolev norm of order O(n) of Christodoulou type, and for sufficiently high powers $p >$O(n). This produces a fanily of global large solutions to the supercritical wave equation on the exterior of the ball, with arbitrarily high power nonlinearity. The almost radial solutions thus constructed are unique among energy class solutions which satisfy an energy inequality, by a weak-strong stability result of Struwe type. Similar results hold for the defocusing supercritical nonlinear Schrodinger equation.