On the spectral density of Dirac operators with divergent potentials

One-dimensional Dirac operators with potentials tending to infinity at infinity and satisfying a mild regularity condition are known to have purely absolutely continuous spectrum covering the whole real line. Under stronger regularity and growth conditions, one can derive asymptotics for the derivative of the spectral density, showing that the spectral density is monotonic for large values of the spectral parameter. Physically, this can be interpreted as the absence of high-energy points of spectral concentration. In the case of radial Dirac operators arising by separation of variables from the higher-dimensional operator with rotationally symmetric potential, even the definition of the spectral density turns out to be an interesting question.

This is in part joint work with M.S.P. Eastham.