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Short title: Exact, zero-energy, square-integrable solutions of a model related to the Maxwell's fish-eye problem.

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Primary classification: 81Q05

Secondary classification(s): 78A05 78A97 81Q80

Review text:

An exercise in making connections between classical optics and quantum mechanics in 2D. Based on a separable, exactly solvable example composed of square well and Pöschl-Teller potential and considered at certain critical couplings called, not quite adequately, "quantized". The existence of parallels between quantum bound states at threshold energy (this is the proper meaning of the puzzling "zero energy" in the title) and classical optical systems called "Maxwell's" (and allowing the rays intersect at two points) is discussed at length. The use is made of the changes of variables which are related to conformal mappings in 2D.