Reviewer: M. Znojil

Theory Group, Nucl. Phys. Institute ASCR, 250 68 Řež, Czech Republic

Authors: Lakaev S. N. and Abdulaev Zh. I.

Short title: Spectral properties of three-particle Schroedinger operator

Publication: Funct. Anal. Appl. 33 (1999) 151 - 153
or, in Russian: Funkts. Anal. Pril. 33 (1999) 84 - 88

Control number: 1 719 298

Primary classification: 39A70

Secondary classification(s): 47B39 47N50 81Q10

Review text:

Efimov effect belongs among the most amazing consequences of quantization of systems composed of three interacting particles. Even if their mutual interactions are not strong enough to bind isolated pairs, they can still generate infinitely many genuine three-body bound states. The authors analyze the mathematical background of this puzzling phenomenon in a discrete-space approximation. Their model Hamiltonian $H_\mu(K)$ is specified as depending on a coupling $\mu > 0$ and quasi-impuls K and its contact two-particle interaction part is, in the above sense, "weak". The authors show that the essential spectrum of $H_\mu(K)$ is formed by the two closed intervals $[E_{min}(\mu, K), E_{max}(\mu, K)]$ and $[\varepsilon_{min}(\mu, K), \varepsilon_{max}(\mu, K)]$ with "maximal" boundaries (Theorem 1). Eigenvalues (if any) can only lie below this domain due to the positivity of the interaction (Theorem 2). Their number $N = N(\mu, K)$ is at most finite at $K \neq 0$ while $N(\mu_{max}, 0) = \infty$ at certain "maximal attraction" μ_{max} (Theorem 3).