Summary: Given a sufficiently symmetric domain $\Omega \Subset \mathbb{R}^2$, for any $k \in \mathbb{N} \setminus \{0\}$ and $\beta > 4\pi k$ we construct blowing-up solutions $(u_\varepsilon) \subset H^1_0(\Omega)$ to the Moser-Trudinger equation such that as $\varepsilon \downarrow 0$, we have $\|\nabla u_\varepsilon\|_{L^2}^2 \to \beta$, $u_\varepsilon \rightharpoonup u_0$ in $H^1_0$ where $u_0$ is a sign-changing solution of the Moser-Trudinger equation and $u_\varepsilon$ develops $k$ positive spherical bubbles, all concentrating at $0 \in \Omega$. These 3 features (lack of quantization, non-zero weak limit and bubble clustering) stand in sharp contrast to the positive case ($u_\varepsilon > 0$) studied by the second author and Druet [8].

MSC:

35-XX Partial differential equations
81-XX Quantum theory

Keywords:
Moser-Trudinger equation; clustering blow-up; nodal solutions; nonzero weak limit

Full Text: DOI


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