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Quantum line defects and refined BPS spectra. (English) Zbl 1453.14132

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Summary: In this note, we study refined BPS invariants associated with certain quantum line defects in quantum field theories of class $S$. Such defects can be specified via geometric engineering in the UV by assigning a path on a certain curve. In the IR, they are described by framed BPS quivers. We study the associated BPS spectral problem, including the spin content. The relevant BPS invariants arise from the $K$-theoretic enumerative geometry of the moduli spaces of quiver representations, adapting a construction by Nekrasov and Okounkov. In particular, refined framed BPS states are described via Euler characteristics of certain complexes of sheaves.

MSC:

14N35 Gromov-Witten invariants, quantum cohomology, Gopakumar-Vafa invariants, Donaldson-Thomas invariants (algebrao-geometric aspects)
81T13 Yang-Mills and other gauge theories in quantum field theory
81T60 Supersymmetric field theories in quantum mechanics

Keywords:
supersymmetric field theory; Wilson-'t Hooft line operators; Donaldson-Thomas invariants; $K$-theory; quiver representation theory

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