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Paul Loya and **Patrick McDonald*** (mcdonald@ncf.edu), Division of Natural Science, New College of Florida, 5800 Bay Shore Road, Sarasota, FL 34243. *The eta invariant for quantum graphs.*

Let G be a compact quantum graph and E an Hermitian vector bundle over G . Let $C^\infty(G, E)$ be the functions $\phi : G \rightarrow E$ which are smooth on the interior of each edge and which have a smooth extension to each closed edge. Given a complex structure on E , the length associated to each edge gives rise to a Dirac operator, $D : C^\infty(G, E) \rightarrow C^\infty(G, E)$. We parameterize self-adjoint extensions of D using a collection of unitary matrices determined by E and the given complex structure. For each self-adjoint extension of the Dirac operator we analyze the eta function and compute the eta invariant using the associated unitary matrix. (Received February 27, 2007)