1037-57-242 **Daniel Ruberman** and **Nikolai Saveliev*** (`saveliev@math.miami.edu`), Department of Mathematics, Box 249085, Coral Gables, FL 33124. *Seiberg–Witten invariants for homology* $S^1 \times S^3$. Preliminary report.

Let X be a smooth spin 4-manifold with homology of $S^1 \times S^3$. In our ongoing project, we study the invariant $\lambda(X)$ obtained by counting points in the perturbed Seiberg–Witten moduli space on X for a choice of Riemannian metric, and adding a correction term to make this count metric independent.

The correction term is in essence the index of the Dirac operator on a spin 4-manifold with the periodic end modeled on the infinite cyclic cover $\tilde{X} \to X$. The index theorem of Atiyah, Patodi, and Singer tells us what this index is, but only in the special case of the product end, when $X = S^1 \times Y$. For general periodic end manifolds, we follow Taubes' approach to obtain the wall crossing formula for the index of the end-periodic Dirac operator, in terms of what can be viewed as an extension of the spectral flow to holomorphic families of Dirac operators. I will describe the progress we have made so far on matching this wall crossing formula with the one for the Seiberg–Witten moduli space (thereby proving the metric independence of $\lambda(X)$).

In the special case of $X = S^1 \times Y$, the invariant $\lambda(X)$ is the Casson invariant of the homology sphere Y; this follows from work of Weimin Chen and Yuhan Lim. (Received February 04, 2008)

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