1053-57-117   **Tomasz Mrowka**, **Daniel Ruberman** and **Nikolai Saveliev*** (`saveliev@math.miami.edu`),
Department of Mathematics, Box 249085, Coral Gables, FL 33124. *Seiberg-Witten equations,
end-periodic Dirac operators, and a lift of Rohlin's invariant.*

We introduce a gauge-theoretic integral lift of the Rohlin invariant of a smooth 4-manifold X with the homology of $S^1 \times S^3$. The invariant has two terms. One is the Seiberg-Witten invariant of X, and the other is essentially the index of the Dirac operator on a non-compact manifold with end modeled on the infinite cyclic cover of X. Both terms are dependent on the choices of Riemannian metric and perturbation on X but we show that these dependencies cancel as the metric and perturbation vary in a generic 1-parameter family. We also discuss some calculations and possible applications of our invariant to the study of homology cobordisms.

A similar dependency issue in dimension 3 was earlier resolved by Weimin Chen and Yuhan Lim by relating the jumps in the Seiberg-Witten invariant to the spectral flow of the Dirac operator; the resulting invariant is then the Casson invariant. (Received August 27, 2009)