

Abstract Submitted  
for the MAR11 Meeting of  
The American Physical Society

**Boundary Wess-Zumino-Novikov-Witten model, BCS superconductivity, and Maxwell-Bloch theory**<sup>1</sup> TIGRAN SEDRAKYAN, VICTOR GALITSKI, University of Maryland, College Park — We establish an exact correspondence between the discrete-state pairing Hamiltonian (Richardson model) and the Wess-Zumino-Novikov-Witten (WZNW) model modified by an additional boundary operator. We solve this boundary WZNW model exactly and from this solution re-derive the Richardson equations of the pairing Hamiltonian. As an example of practical applications of the boundary WZNW model we use the obtained results to derive solution to the Maxwell Bloch theory of a two-level laser with damping and pumping. We use the results to calculate various observable characteristics of a laser: (i) the complex electrical field amplitude, (ii) the polarization of the laser medium, (iii) the population inversion. We discuss the relation of our results to recent experimental data.

<sup>1</sup>This work is financially supported by IARPA

Tigran Sedrakyan  
University of Maryland, College Park

Date submitted: 17 Nov 2010

Electronic form version 1.4