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Quantum and Ionic Transport Across Superconductor-based Heterostructures OSAMA NAYFEH, SON DINH, BENJAMIN TAYLOR, MARCIO DE ANDRADE, PAUL SWANSON, BRUCE OFFORD, ANNA LEESE DE ESCOBAR, Spawar Systems Center Pacific, STEPHANIE CLAUSSEN, Colorado School of Mines, SAM KASSEGNE, San Diego State University — We present analysis of quantum and ionic transport across superconductor/barrier/ionic/barrier/superconductor (SBIBS) heterostructures. Calculations for various ionic configurations demonstrate modification of the quantum transport coherence length and energy profile with moderate ionic transport away from the superconductor-barrier interface. The effect of electric field and cryogenic temperature on the stability of the ionic configurations for quantum information state storage is examined. Characterization and analysis of constructed Al and Nb-based device structures are presented. Acknowledgements: We acknowledge the support of the SSC Pacific In-house Laboratory Independent Research Science and Technology Program managed by Dr. Dave Rees, the Naval Innovative Science and Engineering Program managed by Mr. Robin Laird, and the ONR Summer Faculty Research Program. Interactions with Dr. Van Vechten (ONR) and Dr. Manheimer (IARPA) are appreciated. The views and conclusions contained in this document are those of the authors and should not be interpreted as representing the official policies, either expressed or implied, of SPAWAR or the U.S. Government. Approved for Public Release; distribution is unlimited.

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