Abstract Submitted
for the APR16 Meeting of
The American Physical Society

Pairing in high-density neutron matter including short- and long-range correlations DONG DING, Department of Physics, Washington University, St. Louis, Missouri 63130, USA, ARNAU RIOS, Department of Physics, Faculty of Engineering and Physical Sciences, University of Surrey, Guildford, Surrey GU2 7XH, United Kingdom, HELBER DUSSAN, WILLEM DICKHOFF, SAM WITTE, Department of Physics, Washington University, St. Louis, Missouri 63130, USA, ARTUR POLLS, Departament d'Estructura i Constituents de la Matèria and Institut de Ciènces del Cosmos, Universitat de Barcelona, Avinguda Diagonal 647, E-8
— To address open questions in neutron star phenomenology, pairing gaps of $^1S_0$ and $^3P_2 - ^3F_2$ channels in a wide range of densities has been calculated using three different interactions (AV18 CDbonn N3LO). Traditionally, the Bardeen-Cooper-Schrieffer(BCS) approach has been used to compute gaps from bare nucleon-nucleon interactions. Here, we incorporate the influence of short- and long-range correlations in the pairing gaps. Short-range correlations (SRC) are treated including the appropriate fragmentation of single-particle states, and they suppress the gaps substantially. Long-range correlations(LRC) dress the pairing interaction via density and spin modes, and provide a relatively small correction. Results are relevant and parametrized in a user friendly way for neutron-star cooling scenarios, in particular in view of the recent observational data on Cassiopeia A.

Dong Ding
Department of Physics, Washington University, St. Louis, Missouri 63130, USA

Date submitted: 05 Jan 2016 Electronic form version 1.4