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**Generalizing the Faddeev-Jackiw Technique to Curved Spacetimes to Study Bose-Einstein Condensates in Space** CHANDA PRESCOD-WEINSTEIN, EDMUND BERTSCHINGER, Massachusetts Inst of Tech-MIT — Motivated by the desire to fully understand Bose-Einstein condensates in curved spacetimes, we present a generalization of the Faddeev-Jackiw technique for constraint reduction that simplifies calculating the Poisson brackets for gauge field theories in curved backgrounds. The Faddeev-Jackiw technique is a symplectic approach to phase space coordinate reduction on singular Lagrangians which offers an alternative to the Dirac technique. This approach was generalized by Barcelos-Nieto and Wotzasek to make its application easier. We find that the technique is a useful tool that avoids some of the subtle complications of the Dirac approach to constraints. A major difference between our work and previous formulations is that we do not explicitly construct the symplectic matrix, as that is not necessary. We apply this formulation to the Ginzburg-Landau action and calculate its Poisson brackets in a curved spacetime. We sketch out steps to apply the technique to a Bose field in the gauge theory General Relativity.

Chanda Prescod-Weinstein
Massachusetts Inst of Tech-MIT

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