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Broken time-reversal symmetry phase in a 2D electron fluid by using higher dimensional bosonization[1] WATHID ASSAWASUNTHONNET, EDUARDO FRADKIN, University of Illinois at Urbana-Champaign — We explore a phase in two-dimensional electron fluids in which the time-reversal symmetry is broken spontaneously by using the method of higher dimensional bosonization. This phase breaks time-reversal and chiral symmetries but does not break space inversion and the combination of chiral and time-reversal symmetries. This phase exhibits non-quantized anomalous Hall effect in the absence of external magnetic fields which corresponds to the Berry curvature on the Fermi surface. In the mean-field limit we show that the fluid spontaneously transforms into the the time-reversal broken phase [1]. The properties deep within the phase is also studied by solving the semi-classical equation of the bosonized fields. [1] Kai Sun and Eduardo Fradkin, Phys. Rev. B **78**, 245122 (2008).

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