Abstract Submitted
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Fractionalization of electron's spin and orbital degrees of freedom in 1D[1] KRZYSZTOF WOHLFELD, MARIA DAGHOFER, SATOSHI NISHIMOTO, IFW Dresden, Germany, GINIYAT KHALIULLIN, FKF-MPG Stuttgart, Germany, JEROEN VAN DEN BRINK, IFW Dresden, Germany — We show that electron's spin and orbital degrees of freedom can fractionalize in 1D antiferromagnets: although the orbital excitations are inherently coupled to spinons in antiferromagnetic Mott insulators, in 1D they separate into a *pure* orbiton and a single spinon. This is similar to the spin-charge separation in 1D but corresponds to an exotic regime where spinons are faster than holons [1]. The resulting large dispersion of the pure orbiton can be detected in e.g. quasi-1D cuprates [2]. [1] K. Wohlfeld, M. Daghofer, S. Nishimoto, G. Khaliullin, and J. van den Brink, Phys. Rev. Lett. **107**, 147201 (2011). [2] J. Schlappa *et al.*, to be published (2011).

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