Abstract Submitted
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Exact many-electron ground states on the diamond Hubbard chain[1] ZSOLT GULACSI, Department of Theoretical Physics, University of Debrecen, Debrecen, Hungary, ARNO KAMPF, DIETER VOLLHARDT, Theoretical Physics III, Center for Electronic Correlations and Magnetism, Institute for Physics, University of Augsburg, Augsburg, Germany — Exact ground states of interacting electrons on the diamond Hubbard chain in a magnetic field are constructed which exhibit a wide range of properties such as flat-band ferromagnetism, correlation induced metallic, half-metallic, or insulating behavior [1]. The properties of these ground states can be tuned by changing the magnetic flux, local potentials, or electron density.The results show that the studied simple one-dimensional structure displays remarkably complex physical properties. The virtue of tuning different ground states through external parameters points to new possibilities for the design of electronic devices which can switch between insulating or conducting and nonmagnetic or (fully or partially spin polarized) ferromagnetic states, open new routes for the design of spin-valve devices and gate induced ferromagnetism.
[1] Z. Gulacsi, A. Kampf, D. Vollhardt, Phys. Rev. Lett. **99**, 026404(2007).

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