

Abstract Submitted
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Superconductivity in CuCl/Si superlattices: excitonic pairing?¹

S.H. RHIM, Northwestern University, ROLANDO SANIZ, University Antwerpen, MICHAEL WEINERT, University Wisconsin-Milwaukee, A.J. FREEMAN, Northwestern University — Two-dimensional (2D) hetero-bonded semiconductor interfaces have been suggested as candidate geometries where excitonic superconductivity² – and the greatly enhanced where T_C compared to phonon mechanisms mediation – can be realized. Among experimental efforts, epitaxially grown CuCl on Si (111) has reportedly exhibited excitonic superconductivity at 60~150 K. Our first-principles calculations confirm 2D metallicity at the interfaces due to charge transfer by valence mismatch.³ The excitonic mechanism is investigated by calculating the kernel function, $K(\omega)$, for the average of the electronic contributions to the effective interaction.⁴ The attractive interaction found in the CuCl/Si superlattice indicates the feasibility of excitonic pairing for a certain frequency range.

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²V.L. Ginzburg, Sov. Phys. JETP **20**,1549 (1965)

³S.H. Rhim *et al.*, Phys. Rev. B **76**, 184505 (2007).

⁴Zakharov *et al.*, J.Phys.Condes.Matter **9** 8501 (1997)

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