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The origin of anomalous 3rd neighbor exchange in 2D triangular magnets (NiGa2S4 and others) IGOR MAZIN, Center for Computational Materials Science, Naval Research Laboratory — 2D magnetic materials with triangular lattices have been attracting much interest. Among them one finds the parent compound of an exotic superconductor, $Na_xCoO_2 \cdot yH_2O$, A-type antiferromagnets like $NaNiO_2$, in-plane antiferromagnetism (LiCrO2), spin-liquid type materials ($NiGa_2S_4$), charge-order ($AgNiO_2$). The main structural motif in all of them is the AB_2 plane, where A is a transition metal and B is oxygen or sulfur. Experiments and calculations inevitably find anomalously strong 3rd neighbor exchange coupling in all these triangular planes, despite different band fillings and different magnetic ground states. I will explain why this happens, why this effect is so universal, and why it can be understood entirely on a one-electron level. I will use as an example $NiGa_2S_4$, with a reference to Na_xCoO_2 as well.

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