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antiferromagnets made of spin split ferromagnetic sectors are also illustrated for  $\text{CoBr}_2$ <sup>56</sup> (bulk belonging to SST-2 with sector belonging to SST-5) and  $\text{Ca}_3\text{Ru}_2\text{O}_7$ <sup>60</sup> (bulk belonging to SST-3 with sector belonging to SST-5) in Supplementary Information Section C.

We note that the corresponding hidden spin polarization pro-

**u**   **v**   **c**,   **d**,   **e**,   **f**,   **b**,   **d**,   **e**,   **f**   **SOC**   **d**,   **c**   **b**,   **e**,   **f**

In collinear antiferromagnetic compounds, the existence of  $UT$  in the spin space group (SSG, symmetry group of the system without SOC) means there is a spatial translation  $T$  that connects the atomic sites



response behavior. Furthermore, the bulk antiferromagnets formed by ferromagnetic layers with alternatively aligned magnetic moments along the direction perpendicular to the ferromagnetic



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