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Local dynamic control of spin impurities using chiral molecules (ONSITE presentation)

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Using the chiral induced spin selectivity (CISS) effect we were able to induce local spin impurities on magnetic and superconducting material. Dynamic control of spin impurities was also achieved. The CISS is an electronic phenomenon in which electron transmission through chiral molecules depends on the direction of the electron spin. Thus charge displacement and transmission in chiral molecules generates a spin-polarized electron distribution. This effect is metastable and may generate local magnetic defect that can be enhanced or removed by electric dipole. Also selective process may organize the molecules adsorption. In my talk I will present the CISS effect and its importance, both for applications and basic science. I will show that when chiral molecules are adsorbed on the surface of thin ferromagnetic film, they induce magnetization perpendicular to the surface, without the application of current or external magnetic field. On superconductors chiral molecules generate Shiba like states, as well as change the order parameter of the superconductor. Lastly, I will also point to open questions regarding dynamic control of skyrmions, and the CISS effect.

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