INTERACTION BETWEEN MAGNETIC LAYERS IN STRUCTURES WITH NARROW-GAP IV-VI SEMICONDUCTORS

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9.7 cm

We have calculated the indirect exchange interaction between magnetic layers for the case of a structure with narrow-gap semiconducting IV-VI quantum well. The interaction mechanism for such structure is mostly related with the magnetic polarization of the size-quantized electrons and holes inside the quantum well. In the absence of real carriers within IV-VI semiconductor quantum well, magnetic polarization is provided by virtual electron-hole pairs (an analogue of Bloembergen-Rowland mechanism).
The results of calculations has been used to explain the recent experiments on EuS/PbS/EuS structures with ferromagnetic EuS and narrow-gap PbS with very low concentration of free carriers. The interlayer coupling causes ferromagnetic ordering in these structures.
Also, the effect of magnetic impurities, randomly distributed inside PbS quantum well, on the interlayer magnetic coupling is considered.

13.4 cm

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