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Magnetic corrections to $\pi - \pi$ scattering lengths in the linear sigma model.

We consider the magnetic corrections to pi-pi scattering lengths in the linear sigma model. For this purpose we consider all the one loop corrections in the s, t and u channels, associate to the insertion of a Schwinger propagator for the charged pions, working in the region of small values of the magnetic field. In our calculation we make use of an appropriate expansion of the propagators in this regime. The leading scattering length, $l = 0$, in the s-channel, isospin channel $I = 2$, increases for an increasing value of the magnetic field, whereas the opposite effect is found for the isospin channel $I = 0$. The isospin channel does not receive any corrections. This behavior is is opposite with respect to the thermal corrections reported previously in the literature for the scattering lengths.

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