

Abstract Submitted  
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**Entanglement of magnetic impurities via electron scattering  
with asymmetric coupling constants**

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versity of Lisbon — We study the entanglement generated by electron scattering  
between two fixed magnetic impurities, located in a 1-D quantum wire. The im-  
purities were considered distant and only interact through the spin of a scattered  
electron. We analyzed the asymmetric case produced by the effect of considering  
different exchange coupling electron-impurity factor for each impurity. We used the  
quantum waveguide theory approach to find the probability of electron transmis-  
sion for each spinorial configuration of the system, taking into account the possible  
changes in the directions of the impurities and electron spins. We find resonance  
behavior in the evolution of the probability of electron transmission with respect to  
the impurities separation. We show results for the cases where the average and the  
difference of the exchange coupling electron-impurity factor are constant. From the  
probabilities of electron transmission the entanglement is calculated using the von  
Neumann entropy. We show that the entanglement can be maximized changing the  
initial conditions of the system, like the impurities separation distance and the ratio  
of the electron-impurity exchange coupling factor.

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