Title:	Spin- S impurities with XXZ anisotropy in a spin- 12 heisenberg chain.
Authors:	Singhania, Ayushi (/jspui/browse?type=author&value=Singhania%2C+Ayushi) Kumar, Sanjeev (/jspui/browse?type=author&value=Kumar%2C+Sanjeev)
Keywords:	Spin-S impurities anisotropy Heisenberg chain
Issue Date:	2021
Publisher:	Physical Review B, 104(22).
Abstract:	We study the effect of anisotropy of spin-S impurities on an antiferromagnetic SU(2) Heisenberg chain. The magnetic impurities are assumed to have an XXZ-type anisotropic exchange with their neighboring sites. First, using density-matrix renormalization group technique, we examine spin-spin correlation function, instability of Néel order, and local spin susceptibility in the presence of a single spin-S impurity. Based on the results, we find that the types of spin-S impurities are classified into two groups: (i) nonmagnetic and S = 1 impurities enhance only short-range antiferromagnetic correlation and (ii) S = 1 2 and S > 1 impurities can, in contrast, stabilize a long-range Néel order in the disordered SU(2) Heisenberg chain. Then, we focus on the case of S = 1 2 impurity as a representative of (ii) and investigate the evolution of some experimentally observable quantities such as magnetization, specific heat, and magnetic susceptibility, as a function of concentration and XXZ anisotropy strength of the impurity. We confirm that the Néel order is induced in the bulk spin chain in the presence of finite amount of easy-axis XXZ S = 1 2 impurities. Furthermore, we recover some of the aforementioned features using cluster mean-field theory, which allows us to present results on experimentally accessible quantities at finite temperatures. Interestingly, in the presence of uniform magnetic field, the total magnetization exhibits a pseudogap behavior for low values of applied field. We also discuss the dependence of NMR spectrum on various XXZ impurities and identify that the spin state of Co impurity in SrCu0.99Co0.01O2 is S = 3 2 .
Description:	Only IISERM authors are available in the record.
URI:	https://doi.org/10.1103/PhysRevB.104.224407 (https://doi.org/10.1103/PhysRevB.104.224407) http://hdl.handle.net/123456789/4477 (http://hdl.handle.net/123456789/4477)
Appears in Collections:	Research Articles (/jspui/handle/123456789/9)

Files in This Item:

File	Description	Size	Format	
Need To Add…Full Text_PDF. (/jspui/bitstream/123456789/4477/1/Need%20To%20Add%e2%80%a6Full%20Text_PDF.)		15.36 kB	Unknown	View/Open (/jspui/l

Show full item record (/jspui/handle/123456789/4477?mode=full)
(/jspui/handle/123456789/4477/statistics)