

Abstract Submitted  
for the MAR09 Meeting of  
The American Physical Society

**Dynamically dominant excitations of string solutions in the antiferromagnetic Heisenberg chain in magnetic fields** MASANORI KOHNO, International Center for Materials Nanoarchitectonics, NIMS — We investigate behaviors of dynamical structure factors in the spin-1/2 antiferromagnetic Heisenberg chain in magnetic fields, using Bethe-ansatz solutions. We uncover a well-defined continuum in  $S^{+-}(k, \omega)$ , which comes from 2-string solutions in the Bethe ansatz. It continuously connects the des Cloizeaux-Pearson mode in the zero-field limit and the bound state of overturned spins from the ferromagnetic state near the saturation field. Also, we give a natural interpretation to particles in magnetic fields, psinon and antipsinon, as those carrying fractional quantum numbers  $S^z=+1/2$  and  $-1/2$ , respectively. We argue that not only psinons and antipsinons but also particles representing strings play important roles for dynamical properties of the antiferromagnetic Heisenberg chain in magnetic fields. We confirm the relevance of the present results to real materials through comparisons with experimental results.

Masanori Kohno  
International Center for Materials Nanoarchitectonics, NIMS

Date submitted: 21 Nov 2008

Electronic form version 1.4