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Quasiparticles of the spin-1/2 Heisenberg antiferromagnet on an anisotropic triangular lattice in a magnetic field MASANORI KOHNO, WPI Center for Materials Nanoarchitectonics, NIMS, Japan — We investigate the spectral properties of anisotropic triangular antiferromagnets in a magnetic field using a weak-interchain-coupling approach combined with Bethe-ansatz solutions of a chain. Collective modes induced by interchain interactions behave as quasiparticles (QPs) which show distinctive features in a magnetic field. Different with conventional magnons, they show spin-density-wave-type incommensurate ordering whose momentum strongly depends on the magnetization, high-energy modes originating from 2-string solutions of the Bethe ansatz, and multi-particle crossover in a magnetic field. Their stabilization mechanism is also different from conventional magnons: analogous to collective modes in Fermi liquids, the QPs are induced from liquids of 1D QPs (psinons, antipsinons, and a quasiparticle for a 2-string) by interchain exchange processes, which may thus be regarded as those in a kind of anisotropic-2D spin liquid, distinguished from magnons created from classical orders. In terms of them, various unusual features observed in Cs_2CuCl_4 are quantitatively explained in a unified manner.

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