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Spontaneously magnetized Tomonaga-Luttinger liquid in frustrated quantum antiferromagnets SHUNSUKE FURUYA, THIERRY GIAMARCHI, Univ of Geneva — Spontaneous symmetry breaking and Nambu-Goldstone bosons (NGB) going with it are fundamental for a wide range of physical systems. NGB which governs low-energy physics is affected by dimensionality. In 1D quantum antiferromagnet, although the true long-range antiferromagnetic order is absent, we can consider a counterpart of the NGB of the antiferromagnetic order, that is, the Tomonaga-Luttinger liquid (TLL). Here TLL is related to the short-range antiferromagnetic order and described by a critical relativistic field theory. This nature of TLL is consistent with a general statement of NGB in higher dimensions that the NGB originating from the antiferromagnetic (ferromagnetic) order has a relativistic (non-relativistic) dispersion relation. In this context, it would be very surprising to find a TLL structure compatible with ferromagnetic order. In this talk, I will present a theory of spontaneously magnetized TLL which is realized in quasi-1D geometrically frustrated quantum antiferromagnets.

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