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Spectroscopy of dipolar interactions in trapped-ion crystals

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I'll describe two recent experiments in which weak dipolar interactions were measured between trapped ions in linear crystals. In the first experiment the magnetic interaction between the electronic spin of two trapped-ions was measured. This measurement enabled an improvement of the bounds placed on the existence of light pseudo-scalar or axial vector bosons. In the second experiment, the collective Lamb shift was measured in an array of resonantly excited ions in crystals of up to eight ions.