Contribution ID: **95** Type: **Parallel talk**

Effect of Ultralight Dark Matter on g–2 of the Electron

If dark matter is ultralight, the number density of dark matter is very high and the techniques of zero-temperature field theory are no longer valid. The dark matter number density modifies the vacuum giving it a non-negligible particle occupation number. For fermionic dark matter, this occupation number can be no larger than one. However, in the case of bosons the occupation number is unbounded. If there is a large occupation number, the Bose enhancement needs to be taken into consideration for any process involving particles which interact with the dark matter. Because the occupation number scales inversely with the dark matter mass, this effect is most prominent for ultralight dark matter. In fact, the Bose enhancement effect from the background is so significant for ultralight dark matter that, if dark matter is a dark photon, the correction to the anomalous magnetic moment is larger than experimental uncertainties for a mixing parameter of order 10^{-16} and a dark photon mass of order 10^{-20} eV. Furthermore, the constraint on the mixing parameter scales linearly with the dark photon mass and so new significant constraints can be placed on the dark matter mass all the way up to 10^{-14} eV. Future experiments measuring $g-2$ will probe even smaller gauge mixing parameters.

Session Classification: Parallel 3

Track Classification: Parallel session: Light Dark Matter