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Investigation of the positron Doppler broadening for rubber samples below the glass transition temperature AMANDA TOWRY¹, New Mexico State University, C.A. QUARLES, Texas Christian University — Previous research [K. Sato, et al., Phys. Rev. B71 (2005)012201; C. Quarles, et al., Nucl. Inst. Meth. Phys. Res. B 261(2007)875-878] has demonstrated a correlation between the Doppler broadening S parameter and the intensity of the ortho-positronium lifetime component in polymers which depends on the composition of the polymer. On the other hand, rubber polymers do not show this correlation and behave more like liquids for which the S parameter is essentially independent of the ortho-positronium intensity. The difference between the rubber samples and most polymers studied is that the rubbers were all above the glass transition temperature (T_G) at room temperature. The bubble model in the rubber has been suggested as an explanation of this behavior in analogy with liquids. This research reports the measurement of the S parameter for seven rubber samples below T_G where the bubble model would not be expected to work. The results were obtained by immersing the samples and a Na-22 source in liquid nitrogen. We will discuss how the results below T_G impact the hypothesis of bubble formation in the rubber above T_G .

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