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Fluctuations measured by flush mounted versus proud divertor Langmuir probes – why are they different? O.E. GARCIA, UIT, A.Q. KUANG, D. BRUNNER, B. LABOMBARD, MIT PSFC, R. KUBE, UIT — A flush-mounted, toroidally-elongated, and field-aligned divertor 'rail' Langmuir probe array was installed in Alcator C-Mod in 2015. This geometry is heat flux tolerant and effectively mitigates sheath expansion effects down to incident field line angles of 0.5 degree [1]. Further complications have arisen that cannot be explained by sheath-expansion. In particular, the 'rail' probe geometry measures significantly higher plasma fluctuation levels in the common flux region compared to traditional proud probes, whereas they are similar in the private flux zone. In some instances, the amplitudes of ion saturation current fluctuations normalized to the mean are a factor of 2 higher; probability distribution functions correspondingly record large amplitude events that are not seen by the proud probes. This discrepancy also appears to depend on divertor plasma regime. For example, fluctuations become similar near the strikepoint when the electron temperature is low. To ensure that these discrepancies were not due to perturbations caused by the voltage bias or currents collected by the probes, the two Langmuir probe systems were left to 'float' and the fluctuation statistics analyzed. Yet, even in this non-perturbative situation, there exist clear differences in the fluctuation characteristics. The raises two questions: how does the probe geometry affect plasma fluctuations measurements and what are the true plasma fluctuations experienced by the divertor surface? [1] A.Q., Kuang, et. al. (2016). *Nucl. Mat.and Energy.* Supported by USDoE awards DE-FC02-99ER54512.

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