**Pulse shape discrimination in DarkSide-50** GUANGYONG KOH, Princeton Univ, DARKSIDE COLLABORATION — Dark matter detection with liquid argon relies heavily on pulse shape discrimination to distinguish between the dominant electron recoil (ER) signal from electromagnetic background, and the nuclear recoil (NR) signal expected from a WIMP dark matter candidate. The DarkSide-50 (DS-50) deployment with atmospheric argon (Nov 2013–Jun 2014) provides a high-statistics sample of ER events from $^{39}$Ar beta decay for predicting ER contamination in any NR region in the ongoing campaign (since Apr 2015) with underground argon (which is naturally depleted in $^{39}$Ar). With the underground argon, the most common background changes from single-sited $^{39}$Ar beta decays to often-multi-sited gamma interactions. I will discuss the impact of this on pulse shape discrimination, and in particular on the use of our high-statistics $^{39}$Ar sample in determining the effectiveness of pulse shape discrimination on multi-sited events. See also the DS-50 presentations by X. Xiang and E. Edkins.

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