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) pro-
vides 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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