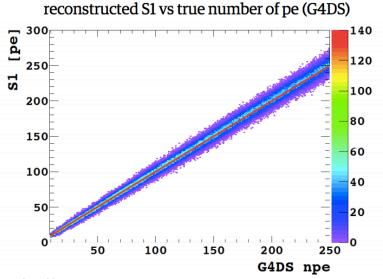
LAr Simulations

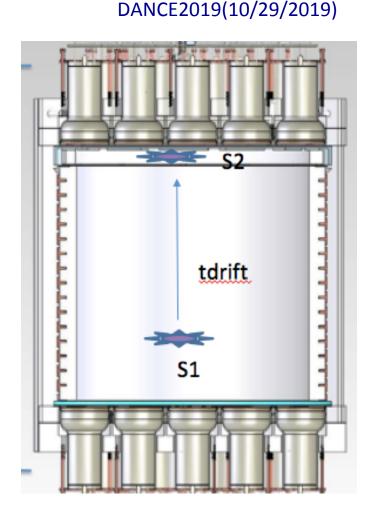
Sagar Poudel (Graduate Student, University of Houston)

GEANT4 simulations

- GEANT4 based Simulation Package g4ds
- Physical processes embeds
- G4EmLivermore Physics,
- High Precision Neutron(HP) for <20 MeV neutrons
- Precision Argon Response Ionisation and Scintillation (PARIS)

for physical processes leading to S1 and S2.





Challenges

- Ability to correctly identify pulses(S1 or S2), multiple S2

- Simulating for S2 photons is computationally extensive. But its important for low mass DM search, better PSD power for upcoming DS detectors

-Simulating $\beta\text{-}\gamma$ events in S1 as in K-42 decay channel

FLUKA for simulations of muons and cosmogenic neutrons background

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| 🕂 🦲 Physics | | | | IGNMA : 26 cards hidden |
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| + Biasing + Scoring + Flair | Type: X-Y-Z ▼ Part: ENERGY ▼ | Xmin: -45 Ymin: -54 Zmin: -33 | Xmax: 45 Ymax: 54 Zmax: 36 | NX: 100 NY: 100 NZ: 100 |
| | Proton fluence | 200033 | 211107. 20 | 12.100 |
| | WSRTRACK Type: Log v | Reg: TARGET V | Unit: 51 BIN V | Name: Proton Vol: 1 |
| | Part: PROTON V | Emin: 0.001 | Emax: 20 | Bins: 100 |
| | Neutron fluence USRTRACK Type: Log v | Reg: TARGET V | Unit: 51 BIN V | Name: Neutron Vol: 1 |
| | Part: NEUTRON V | Emin: 1E-09 Type: All V | Emax: 20 Unit: 52 BIN ¥ | Bins: 100 Name: Target |
| | Max Z: | Max M: | Reg: TARGET V | Vol: 1 |
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- Right now running FLUKA simulations with Docker Image-to- Singularity Image at Cluster

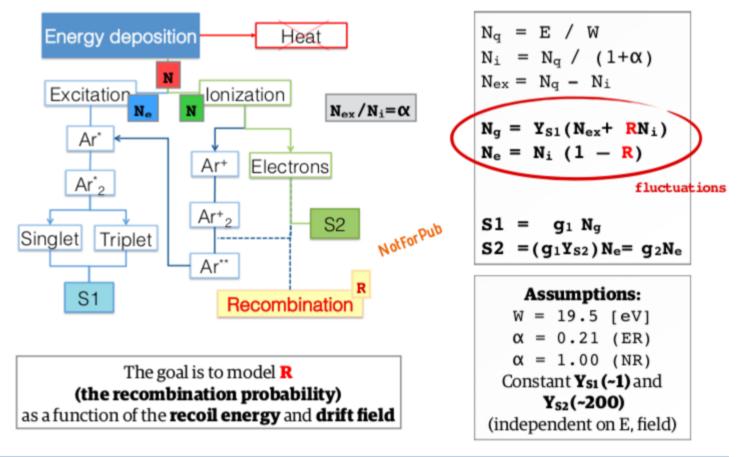
Challenges with FLUKA

- version conflict, complexity of installing many dependencies(using FLAIR)
- increasingly complex geometry of detectors
- and computational challenge for longer simulation livetime

BACKUP

The PARIS model

Precision Argon Response Ionization and Scintillation



Paolo Agnes

G4DS status