LDRD Q2
LD2506
Gravitational Form Factor

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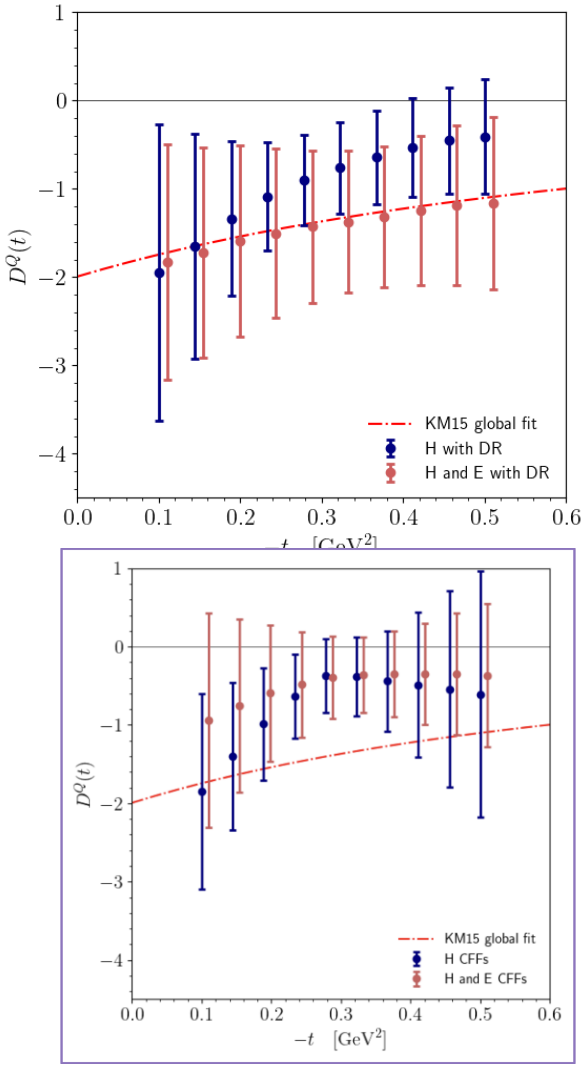
Q2 meeting

Progress report LDRD 2506

Team :Volker Burkert David Richards Melany Higuera Daniel Lhersch

- Extraction of subtraction constant from exclusive data which relates to pressure at surface of nucleon
- Milestones
  - Fitting with Neural Network
    - NN-25-1 Test the constrained NN fit on existing data including LQCD constraint from 1st year (1 month)
    - NN-25-2 Request computing resources for the training of the NN (1 month)
    - NN-25-3 Training of the NN and extraction of the GFFs (5 months)
      Optimization of parameters of Neural Network
    - NN-25-4 Generation of DDVCS and TCS pseudo data with PARTONS and CLAS12 and SoLID Simulation (3 month)
    - NN-25-5 Evaluation of the potential improvement on the GFF extraction when using DDVCS and TCS pseudo data at 11 and 22 GeV (1 months)
    - NN-25-6 Publication of GFF fitting (2 months)
  - LQCD calculation of GFFs
    - LQCD-25-1: Calculation of the disconnected diagrams needed for the isosinglet proton distributions (3 months)
    - LQCD-25-2: First calculation of isoscalar GFFs of the proton (9 months)
      2 contributions : disconnected (appear to be small) and connected -
  - Paper on database submitted
  - Optimization of NN parameters procedure done -
  - Global fit on going – Software set up on the farm for quicker optimization of NN parameters
  - Expect to finish collecting statistics on the disconnected diagram over the next month, and then begin the analysis of the low flavor-separated moments of PDFs

- Issues
  - LQCD data included in database but only isovector contribution
  - First look at LQCD showed contribution small; working to increase statistics to better resolve, and anticipate extracting PDF and low moments of PDF
  - Study of NN parameters time consuming and computing of dispersion relation is slow : setup on farm
    Estimation around 5 days to do global fit on all available data

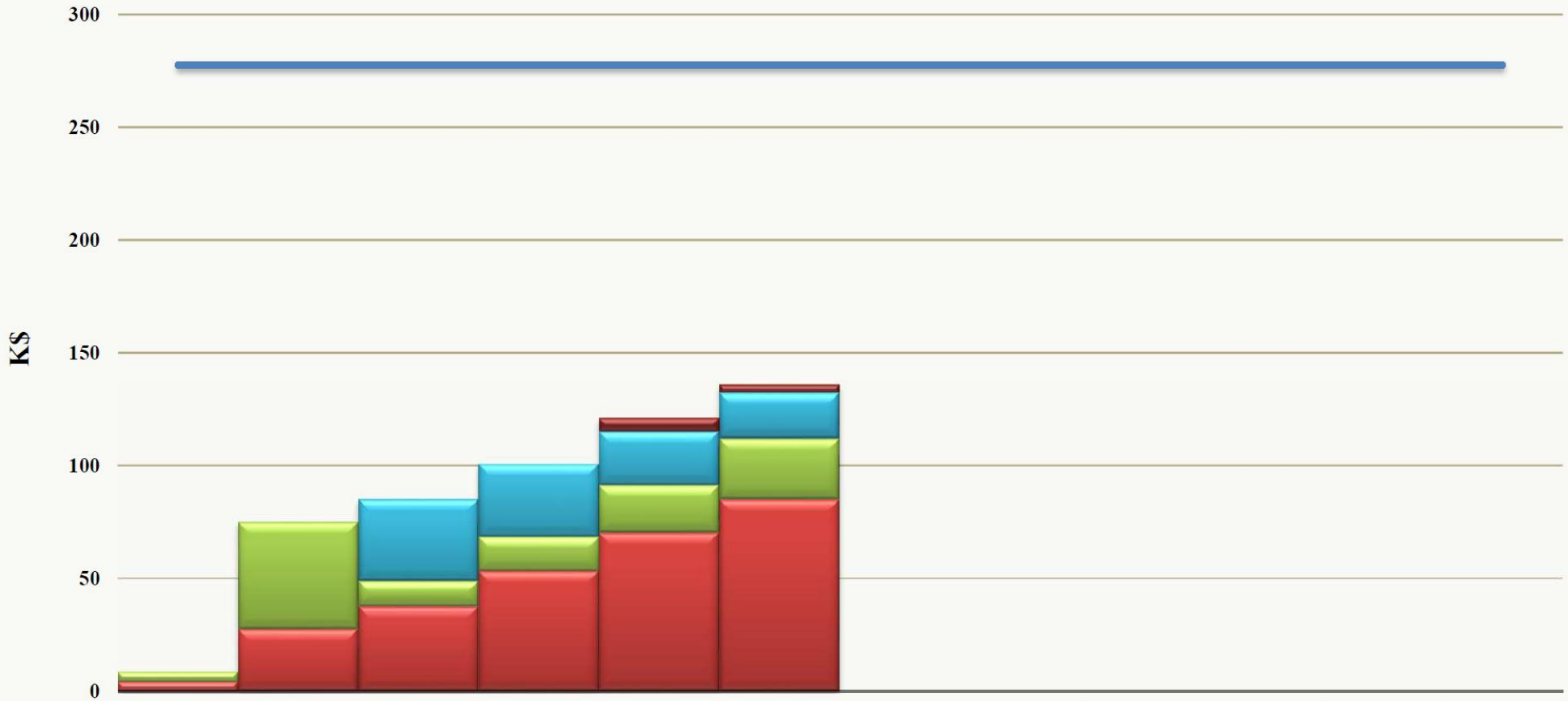


D terms extracted using 6 and 11 GeV CLAS data
Before (top) and after (bottom) optimization

Financial report

Close to be on track

Travel expenses to work on final result and paper with collaborators



	Oct-24	Nov-24	Dec-24	Jan-25	Feb-25	Mar-25	Apr-25	May-25	Jun-25	Jul-25	Aug-25	Sep-25
YTD Spending	9	75	85	101	121	136	0	0	0	0	0	0
Pending	0	0	0	0	6	3	0	0	0	0	0	0
Open Obligations	0	0	36	32	24	20	0	0	0	0	0	0
Expenses	4	47	11	15	21	27	0	0	0	0	0	0
Labor	4	28	38	53	70	85	0	0	0	0	0	0
Funding	278	278	278	278	278	278	278	278	278	278	278	278
3-Mo Avg Projection												