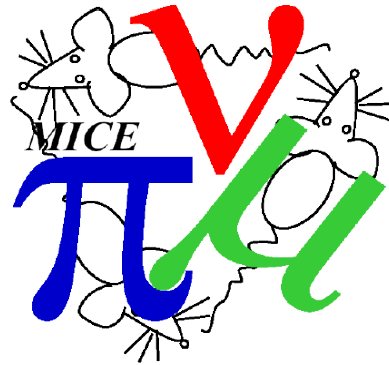




# Publication of Step IV Data

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# Papers to Complete



- Papers in the pipeline
  - Emittance measurement
  - Emittance evolution – rapid communication
  - Field-off scattering
- Analyses approaching the pipeline
  - Field-on scattering
  - Energy loss
  - Emittance evolution – full analysis
- Supporting technical papers
  - Detector and Magnet alignment
  - Non-linear beam optics
  - System performance paper
- Data taking plan for IH2
  - What data (and risks) in what order?

# Emittance Measurement



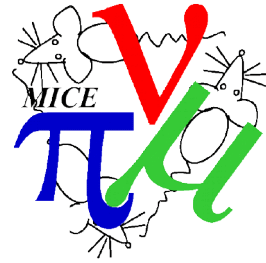
- Beam impurity and effect on measurement
- Effect of cuts on systematic uncertainty
  - TOF01 cut
  - TOF position cut
  - Aperture cut
  - Momentum Binning
  - (p-value cut/multiple tracks cut)
- Look at track quality cut (p-value cut vs chi2 cut or matching with the tof?)
- Estimate tracker inefficiency
- Momentum scale and hall probes
- Tracker resolution
  - Non-uniformity of the field
  - Go upstream from tracker to tof (e.g. compare Rayner reconstruction and tracker reconstruction)
- Promise to complete MICE note by CM48 (KL)

# Emittance Evolution Plans



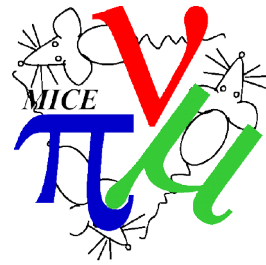
- Refactor analysis routines to deal with more data (30 hours)
- ~~Add downstream cuts for badly reconstructed events and decays (20 hours)~~ **12 hours**
- Improved PID cut (6 hours)
- Analysis of apertures (40 hours)
- Event selection to get a matched beam (40 hours)
- Tidy up uncertainty analysis (40 hours/**8 hours**)
  - Second pass on the general approach
  - Field magnitude in tracker region
  - Effect of uncertainty in tracker alignment to field
- Improved amplitude calculation - beam ellipse calculation separate to amplitude calculation (10 hours)
- MC Uncertainties (geometry/densities, fields) (40 hours)
- Welcome density analyses if they can be done in a timely manner

# Emittance Evolution Antiplans



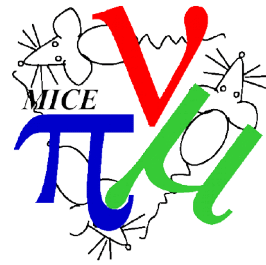
- Jobs I am not planning to do, subject to referees
- Beam-based magnet alignment and magnitude
  - This is a paper in itself
- Running COMSOL to validate Hall probes in tracker region;
  - comparison with the field mapping data
  - This is a paper in itself
- TOF systematic uncertainty
  - My opinion - probably at 100-200 ps level
  - but it is only used for PID and validation of tracker
  - I won't wait for TOF

# Field-off scattering



- ~~Validate code~~
- ~~Update Note (new round of plots)~~
- ~~Moliere model comparison~~
- Implement P correction (1 week)
- Reprocess data with MAUS v2.9.x (C&S/W)
- Build MC with MAUS v2.9.x (C&S/W)
- Include tracker efficiency in analysis (2 weeks)
- Incorporate Neon scattering in Xenon and LiH analysis (2 weeks)
  
- Question:
  - Shall we include Xenon and Neon in this publication or publish separately?
  - The analysis is harder...

# Data Taking plan for IH2



- 36 days (19 Sep 2017 - 27 Oct 2017)
- What are the priorities?
- What order to we want to take the risks?
- Propose
  - Fill IH2 (5 days, before data taking starts)
  - Field-off scattering data (2 days)
  - Ramp magnets (5 days)
  - Flip mode, no M2D, one setting (3 days)
  - Flip mode, M2D, one setting (3 days)
  - Boil off IH2 - subsequent settings are empty (1 day)
  - Flip mode, M2D, one setting (3 days)
  - Flip mode, no M2D, one setting (3 days)
  - Field-off scattering data (3 days)
- 23 days + 13 contingency
- Analysis team will prepare “shopping list” for contingency
  - Hard to recondense IH2