TDR-subsystem scheme

ePIC contribution to TDR, the global picture (a reminder)

CHAPTER 2

2 Physics Goals and Requirements

- 2.1 EIC Context and History
- 2.2 The Science Goals of the EIC and the Machine Parameters.
- 2.3 Scientific Requirements
  - 2.3.1 Systematic Uncertainties
  - 2.3.2 Radiative Corrections
- 2.4 The EIC Science (ePIC performance for key observables)
  - 2.4.1 Origin of Nucleon Mass
  - 2.4.2 Origin of Nucleon Spin
  - 2.4.3 Multi-Dimensional Imaging of the Nucleon
    - 2.4.3.1 Imaging in Momentum Space
    - 2.4.3.2 Imaging in Transverse Position Space
  - 2.4.4 Properties of Nuclear Matter
    - 2.4.4.1 Gluon Saturation
    - 2.4.4.2 Nuclear Modifications of Parton Distribution Functior
    - 2.4.4.3 Passage of Color Charge Through Cold QCD Matter

CHAPTER 8

8 Experimental Systems

- 8.1 Experimental Equipment Requirements Summary
- 8.2 General Detector Considerations and Operations Challenges
  - 8.2.1 General Design Considerations
  - 8.2.2 Backgrounds and Rates
  - 8.2.3 Radiation Level
- 8.3 The ePIC Detector
  - 8.3.1 Introduction
  - 8.3.2 Magnet
  - 8.3.3 Tracking
  - 8.3.4 Particle Identification
  - 8.3.5 Electromagnetic Calorimetry
  - 8.3.6 Hadron Calorimetry
  - 8.3.7 Particle Identification
  - 8.3.8 Far-Forward Detectors
  - 8.3.9 Far-Backwards Detectors
  - 8.3.10 Polarimetry
  - 8.3.11 Readout Electronics and Data Acquisition
  - 8.3.12 Software and Computing
- 8.4 Detector Integration
  - 8.4.1 Installation and Maintenance
- 8.5 Detector Commissioning and Pre-Operations

ePIC responsibility

Joint responsibility

Project responsibility

Detector text in the TDR, a scheme

FOR EACH SUBSYSTEM

- Requirements
  - From **physics**
  - **Radiation hardness**
  - Expected **data rates**
- Justification
  - Device **concept and justification** for the technological choice
  - **Description**
    - General device description
    - Sensors
    - FEE (for rates with reference to a global table in electronics/DAQ section)
    - Other components (f.i.: radiators in calorimetry and in Cherenkov devices, …)
  - **Performance** from available input (lab studies, test beam, prototyping, simulation studies)
- Implementation
  - **Services** (cooling, gas system, sensor power supply, FEE power supply, …)
  - Subdetector **mechanics and integration**
  - **Calibration, alignment and monitoring** strategy and tools
  - **Status and remaining design effort**
    - R&D up to here (and missing, if any); E&D status and outlook
    - Other work needed for design completion
    - Status of maturity (with reference to next slide)
  - **ES&H** (Environmental, Safety & Health) aspects and **QA** (Quality Assessment) planning
  - **Construction and assembly planning**
  - **Collaborators** (=Institutions) and their role, resources and workforce
  - **Risks and mitigation strategy**

Detector text in the TDR, general indications

- An obvious question from DSC side is: **who many pages**?
  - The lengths of the text dedicated to each subsystem will be different because of the different complexity and progress status of the subsystems
  - We aim at a test dedicated to the detecor of (indicatively) 150-200 pages (figures included)
    - we have 15 DSCs + the electronics/r-o/DAQ WG + software and computing
    - Please, be so clever to tune the length of your text according to these figures
- You are invited to put more information in dedicated notes to be posted at present in the collaboration Wiki (to be moved in the most appropriate frame of the collaborative tool as soon as available)
  - These notes can be part of the references in your TDR text, enrich the information that you are making available
  - This material will also be of great help for the detector-dedicated paper