

# R2D2 the Research Racetrack Dipole Demonstrator

## - Conceptual Design Review -

### 1. Participants

#### **Review committee:**

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#### **Observers:**

**CERN:** J.C. Perez, S. Izquierdo Bermudez, D. Tommasini, H. Felice, A. Ballarino

**CEA:** L. Quettier

#### **Presenters (CEA team):**

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### 2. Abstract

Within the framework of a collaboration between CEA and CERN for FCC magnet studies, CEA is developing a Nb<sub>3</sub>Sn subscale demonstrator called R2D2 (Research Racetrack Dipole Demonstrator). The conceptual design is almost finalized, and the detailed engineering design has started. Some trials and winding tests have been performed or are ongoing. The particularity of this magnet is to be composed of graded coils (2 cables wound in the same coil layer), with cables guided outside of the coils for external splices. The goal of this Conceptual Design Review (CDR) is to review the different aspects of the conceptual design of R2D2, with a strong focus on the external splices concept and its implications.

### 3. Charge

- a. Have the goals of the project been clearly stated/explained?
- b. Is the design overall solid? Magnetic design, protection, and mechanics.
- c. Are the field and current levels sufficient to validate the grading concepts?
- d. Are there unidentified risks associated to the design?
- e. Is there a sufficient level of tests and R&D?
- f. Does the maturity of the design allow moving to the engineering design phase? For example: winding two grades, dealing with contraction during heat treatment, concept of longitudinal support...
- g. In particular: is the concept of external splices adequate for R2D2? Are there enough tests foreseen?
- h. Does the schedule seem reasonable for the engineering and fabrication steps?
- i. Are the design tools appropriate for this project?
- j. Is the team sufficiently benefiting from past experiences?

### 4. Outside of the CDR scope

- Conceptual design of F2D2 → design for the long term
- Detailed (engineering) design of R2D2 → covered in the EDR
- Fabrication of SMC → covered in the FRR