Status and plans for the CLIC module studies

Create comprehensive overview document (2024)

- Introduction
- Supporting System (Matthew, see details later)
- Vacuum System (Steffen, Vacuum group)
  Document requirements, solutions found and experimental results
- RF-system (Alexej, Ping, Steffen, Matthew)
  refer to current models, BOM, rf losses, power requirements, stability requirements, tolerances, Kai's simulations on cooling
- Cooling and Ventilation
  requirements, relevant numbers, solutions found, detailed schematic for a module, Pedro's global report
- Cost (Carlo)
  update of costing and tables with cost per item
- Production and Installation strategy (Steffen, Helene)
  Conceptual description of the preferred strategy
- Alignment (Helene)
  procedure, tolerances, requirements, solutions found, instrumentation
- Instrumentation (BI, Alexej)
  BPM's, RF-diagnostics, Water diagnostic
- Sustainability
  Arup report, Benno's work

Matthews to do list ☺

State of the CLIC Module Design and Development, Q4 2023:

1. Introduction
    a. Previous Module Designs
    b. Current Module Design
        i. Two Beam Module
        ii. Klystron Module
        iii. Girders
        iv. Supports
2. Component Alignment
    a. Structure Alignment
        i. Kinematics
        ii. Version 3 (CLICADJV3)
            1. Design
            2. Testing
            3. Flexures
        iii. Version 4 (CLICADJV4)
            1. Design Updates
            2. Testing
            3. Universal Joints
        iv. Thermal constraints
    b. Active Module Alignment
        i. Design
            1. Kinematics
            2. Parasitic Motion
            3. Actuators
            4. Universal Joints
            5. Labview Controls
        ii. Testing
            1. Methods
            2. Results
        iii. Wire Position Sensors
            1. Technical Information
            2. Labview Controls
3. Module Stiffness
    a. Modal Analysis
        i. Joint Stiffness
    b. Harmonic Analysis
    c. Design implications
    d. Testing
4. Module Integration
    a. Waveguide Networks
        i. Two Beam Module
            1. Components
            2. Supports
        ii. Klystron Module
            1. L-Shaped Waveguide
            2. Choke-mode Flange
        iii. Double–Height waveguides
            1. Double-Height flanges
    b. Water cooling
    c. Vacuum pumping
    d. Component supports
5. Alternative Modules
    a. Single girder support
    b. Cam movers

6. Future Work

Possible module activities in 2024

- ❑ Complete / write the above-mentioned documentation
- ❑ More work on sustainability
  Continue and refine Benno's work, full life cycle assessment
  Study heat recovery possibilities
- ❑ Complete module integration
  full 3D model including water piping, supports, cabling, BOM
- ❑ Industrial study of the full module, cost, cost reduction, manufacturability