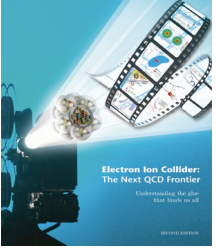


DOCUMENTAZIONE & QUESTIONI APERTE

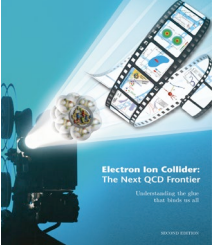
In preparazione alla discussione INTERNA a
EIC_NET

7-8/11/2019

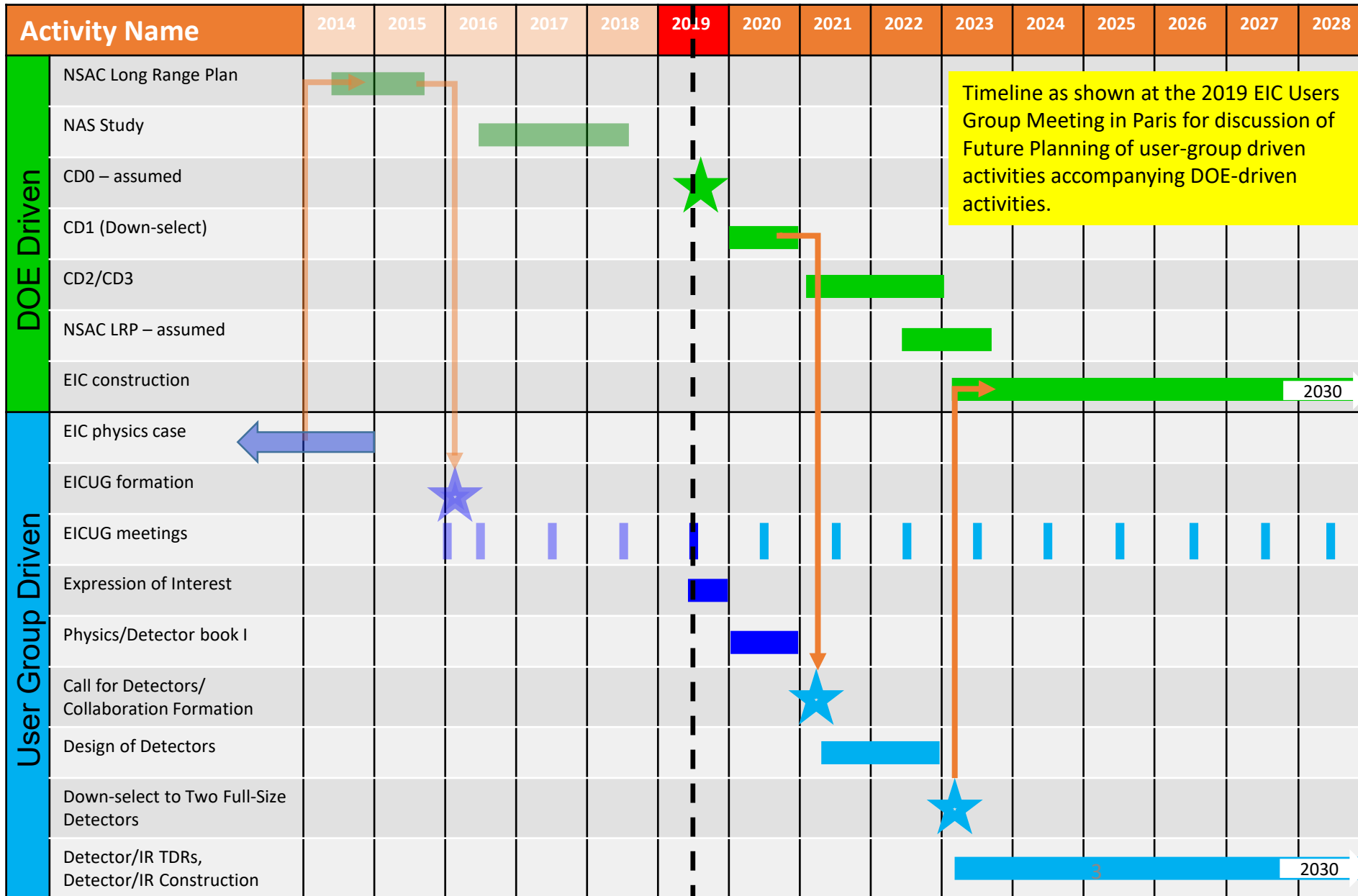
S. Dalla Torre



TIMELINES

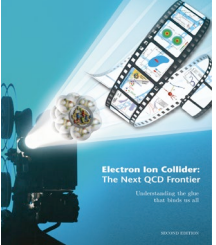


TIMELINES as elaborated by EICUG (shown in Paris)

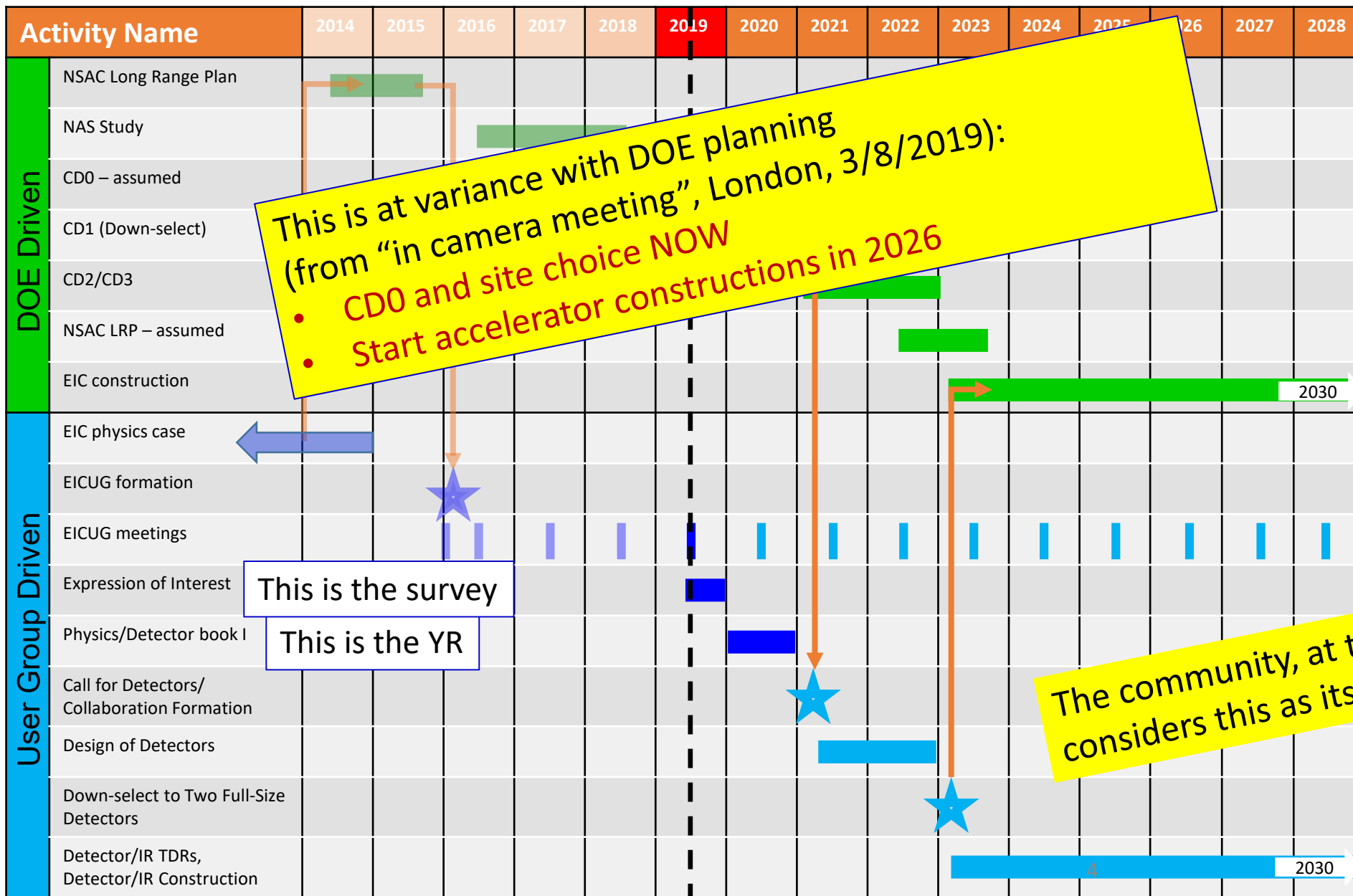


Timeline as shown at the 2019 EIC Users Group Meeting in Paris for discussion of Future Planning of user-group driven activities accompanying DOE-driven activities.

CD0 = DOE “Mission Need” statement;
CD1 = design choice and site selection
CD2/CD3 = establish project baseline cost and schedule



TIMELINES as elaborated by EICUG (shown in Paris)



This is at variance with DOE planning (from "in camera meeting", London, 3/8/2019):

- CD0 and site choice NOW
- Start accelerator constructions in 2026

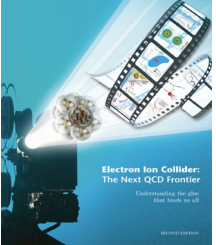
This is the survey

This is the YR

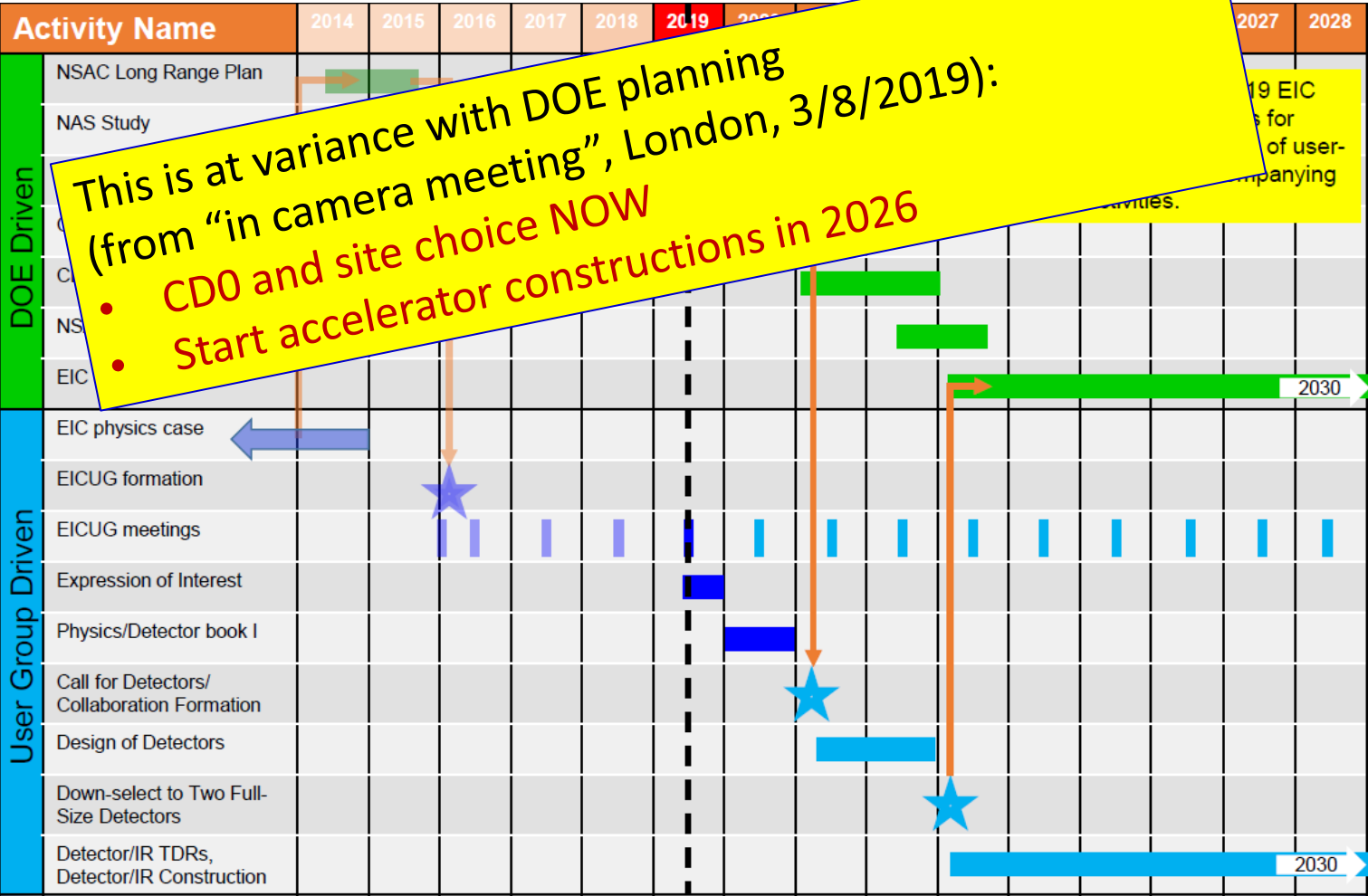
The community, at the moment, considers this as its time-frame

“Mission Need” statement;
 choice and site selection
 project baseline cost and schedule

CD0 = ...
 CD1 = est
 CD2/CD3 = est



EIC_NET in this context



This is at variance with DOE planning (from "in camera meeting", London, 3/8/2019):

- CD0 and site choice NOW
- Start accelerator constructions in 2026

Le collaborazioni EIC si formano nel 2021

→

Come INFN costruiamo la partecipazione ed il piano finanziario nel 2021

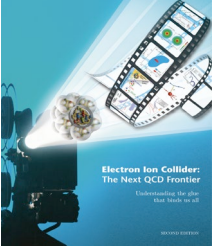
→

La sigla preparatoria EIC_NET ci e' utile nel triennio 2019-2021

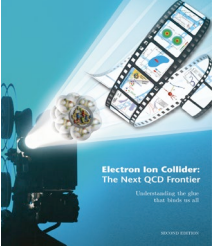
(in accordo con le dichiarazioni iniziali)

→

dal 2022 parte l'attivit  come esperimento in costruzione



EICUG SURVEY

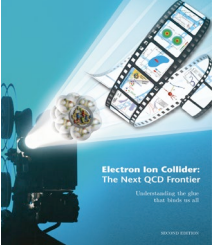


EICUG SURVEY - history

- Announced at EICUG2019 in Paris (end of July)
- Initial dead-line for filling: 31/8
- After negotiation (Italian request), dead-line moved to 15/9
- This calendar made it almost impossible to discuss inside EIC_NET before answering → no coordination in answers

- In practice, effective dead-line on October 15, but the EIC_NET groups had answered before

IN CONCLUSION, answers w/o coordination due to confused calendar



EICUG SURVEY - the questionnaire

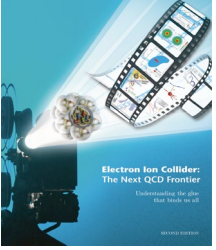
Campi da riempire, un entry per gruppo a cura del rappresentante in IB

- Istituzione / dimensione gruppo
- Interesse fisica del gruppo
- Interesse rivelatori del gruppo
- Infrastrutture disponibili localmente

Mancavano domande esplicite su expertize,
Anche se si chiedeva di aggiungere informazione nei commenti !

Abbiamo risposto così':

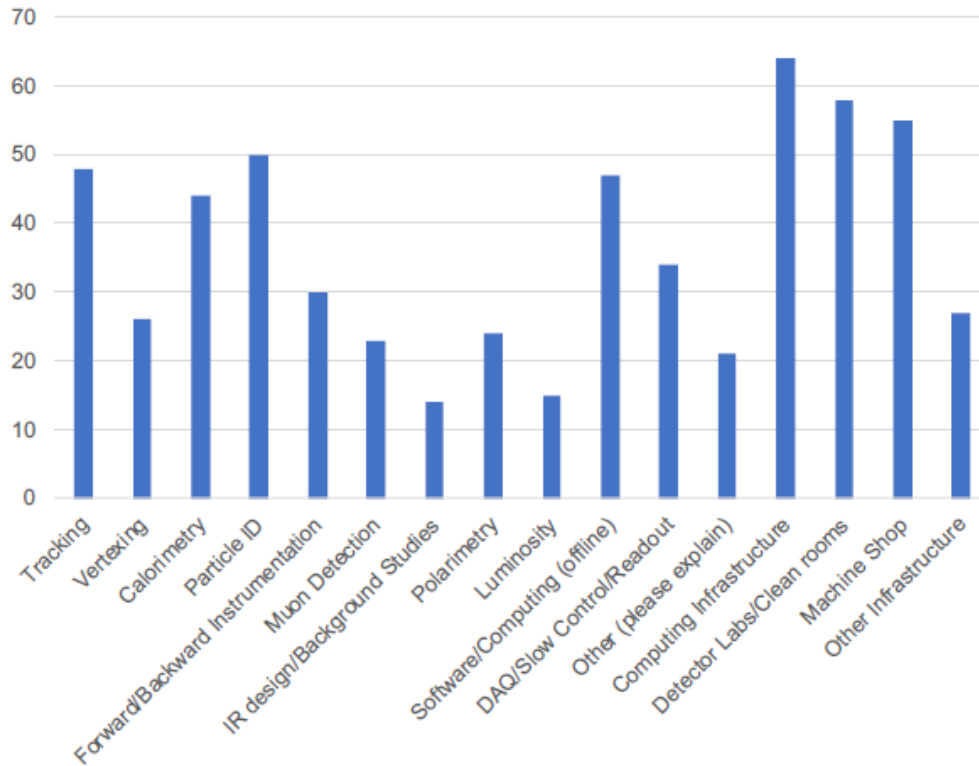
	manpower	interesse fisica	interesse rivelatori /aspetti tecnici
BA	5 staff, 1postdoc, 1 PhD, 1 undergr, 1 tech.	3D nucleon / nucleus structure; High density parton physics; Hadronization and fragmentation; Collective effects	Vetexing; PID; software-computing; slow controls
BO	3 staff+ 1 undergr	High density parton physics; Hadronization and fragmentation: Collective effects: Spectroscopy	PID with TOF; software-computing
FE	4 staff, 2 postdoc, 2 PhD, 1 undergrad, 2 Tech	Longitudinal (spin) nucleon structure; 3D nucleon / nucleus structure; Beyond Standard Model / Electro-weak physics; Hadronization and fragmentation	Calorimetry; PID
GE	4 staff, 3 postdoc, 1 PhD, 2 undergrad, 2 Tech	3D nucleon / nucleus structure; High density parton physics; Beyond Standard Model / Electro-weak physics; Hadronization and fragmentation ; Nuclear structure / Short-range correlations; Spectroscopy	Calorimetry; DAQ
PD	Description of the whole PD physics department		
TS	4 staff, 3 postdoc, 3 PhD, 1 undergr, 2 tech	Longitudinal (spin) nucleon structure; 3D nucleon / nucleus structure; hadronization and fragmentation; origin of the nuclear force; origin of the mass	PID, software-computing



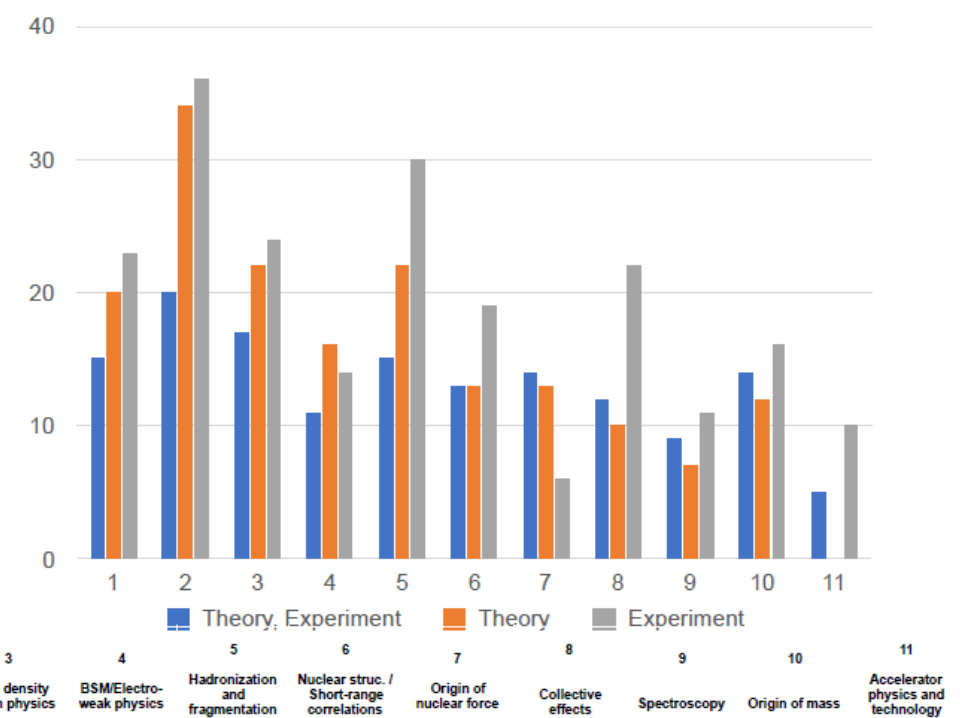
EICUG SURVEY - the questionnaire

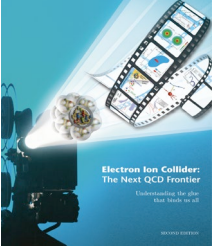
EICUG ha risposto così
(112 gruppi su 194):

Hardware interest

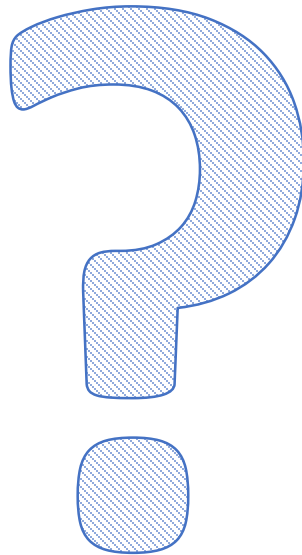


Physics interest





EICUG SURVEY - the questionnaire

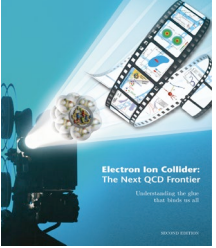


Formulario troppo scarso:

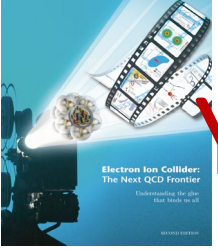
Manca la separazione ben esplicita fra Competenze già' acquisite e interessi per attività' future

L'analisi presentata e' molto embrionale

Non sembra (punto di vista personale)
di grande utilità'
per preparare il future di EIC



YELLOW REPORT



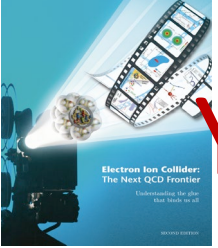
YELLOW REPORT – ANALISI DOCUMENTO

EIC Physics and Detector Concepts: The Path to a Yellow Report

1 or 2 documents (to be decided later)

GOALS

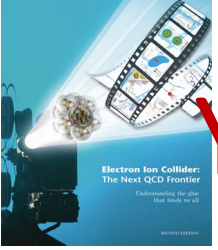
- Physics studies (previous: White Book, INT program proceedings)
- Detector concept (previous: Detector and R&D Handbook)
- **complementarity of the two detectors/interaction regions**
- input towards future Technical Design Reports (TDRs)



YELLOW REPORT – ANALISI DOCUMENTO

Strategy

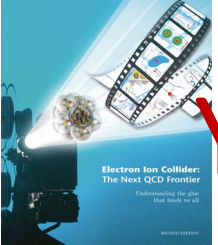
- Quantify **physics measurements for detector requirement**
 - Consequently, motivation for the **complementarity of the two detectors**
- Study detector concepts
 - Quantify the results offered by different detector concepts
 - Keep open multiple concepts
- **Optional:** Study opportunities for **accelerator physics experiments** at EIC
- Engage the [working] EIC community independent of laboratories or hosting site
 - Path to formation of protocollaborations



YELLOW REPORT – ANALISI DOCUMENTO

APPROACH

- Completed by April 2021
- Form working 2 groups on physics and development
(+ optional: accelerator group)
 - Each group should have 3 conveners (= editors of final Reports)
 - Detectors: mainly experimentalist, 1 theorist possible
 - Physics: mixt
 - 1 member SC observer of the group
 - Weekly meeting of the groups
 - Monthly joint meeting



YELLOW REPORT – ANALISI DOCUMENTO

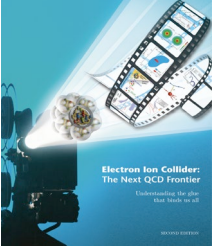
APPROACH, cont.

- Subgroups / Subdivision for key topics only
 - Defined by the SC
 - Led by a sub convener

tentative

- **Detector**
 - Following the EICUG *Request of Information* call:
 - Tracking
 - Vertexing
 - Calorimetry
 - Particle ID
 - Forward instrumentation / Backward instrumentation
 - IR design / Background studies
 - Ancillary Measurements: Polarimetry, Luminosity
 - Software / Computing
 - DAQ / Slow Controls / Readout
 - Other
 - The three areas below have been added as they are important to study and document in the Yellow Reports:
 - Magnetic field options (configuration, strength, impact on machine, IR compatibility)
 - Arguments for 2 complementary detectors
 - Overall design/integration

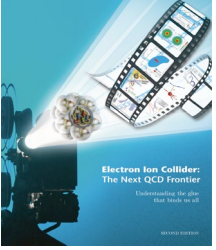
- **Physics**
 - Following the EICUG *Request of Information* call:
 - Longitudinal (spin) nucleon structure
 - 3D nucleon / nucleus structure
 - High density parton physics
 - Beyond Standard Model / Electro-weak physics
 - Hadronization and fragmentation
 - Nuclear Structure / Short-range correlations
 - Origin of nuclear force
 - Collective effects
 - Spectroscopy
 - Origin of mass
 - Other



YELLOW REPORT – ANALISI DOCUMENTO

New lists presented on 24 October, also from our input (EICUG quarter meeting)

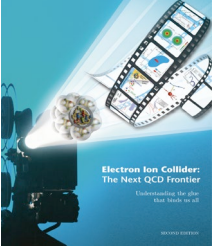
- Tracking
 - Vertexing
 - Calorimetry
 - Particle ID
 - Forward instrumentation / Backward instrumentation
 - IR design / Background studies
 - Ancillary Measurements: Polarimetry, Luminosity
 - Software / Computing
 - DAQ / Slow Controls / Readout
 - Other
1. Inclusive/Semi-inclusive Structure Functions and PDFs (F2, FL, g1, etc.)
 2. 3D spatial imaging of nucleon/nuclear structure
 3. 3D momentum imaging of nucleon/nuclear structure
 4. High density parton physics
 5. Beyond Standard Model / Electro-weak physics
 6. Particle transport in matter and hadronization
 7. Nuclear Structure / Short-range correlations
 8. Jets and Heavy Flavors
 9. Origin of nuclear force
 10. Collective effects
 11. Spectroscopy
 12. Origin of mass
 13. Diffractive Physics



YELLOW REPORT – ANALISI DOCUMENTO

MANPOWER

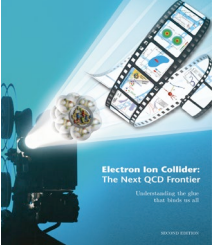
- Each group ≥ 30 members
- Each subgroup ≥ 4 members
- Substantial participation expected from people in the generic R&D program for EIC



YELLOW REPORT – ANALISI DOCUMENTO

MEETINGS

- 2-day kick-off meeting (apparently mid December)
 - 12-13/12/2019 @ MIT
 - Summarize current status on physics (WP + new efforts) and detector concepts
 - Summarize software and simulation tools available describing the current detector and interaction region concepts
 - Split in parallel sessions (physics, detector, optional accelerator) for further organization sessions
- 3-4 workshop every 3-4 months in alternating sites with video option
- Final meeting: spring 2021 at latest



YELLOW REPORT ANALISI DOCUMENTO

16/10 riunione RL-EIC_NET per mandare input

TIMELINES

Oggi siamo qui

September 20, 2019: Distribute (web/email) purpose and idea behind the Yellow Report efforts as introduced as User-Group driven activity (see Appendix) at the EIC Users Group Meeting in Paris.

October 10, 2019: Pre-announce effort/plan at quarterly EICUG Institutional Board phone call, fold in input of IB on plan and possible location for workshops.

October 2019: SC decides on structure, subgroups, and picks conveners. Work with conveners to get tentative dates/locations for workshops.

October 24, 2019: Pre-announce effort/plan at quarterly EICUG phone call, fold in input of community.

Early November 2019: Announce final effort/plan through mailing lists, invite/ask for participation for workshops (perhaps by mechanism that people can pre-sign up for some meetings)

Late November 2019: SC and Conveners decide on subconveners

December 2019: 2-day Kick-off Meeting

February/March 2020: 1st Workshop

May/June 2020: 2nd Workshop

August 2020: Include session on (short) status reports of main groups (physics, detector and possible accelerator) in EICUG meeting

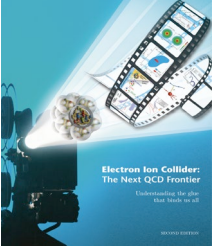
September/October 2020: 3rd Workshop

November/December 2020: 4th Workshop (drafts of subgroup reports should be available at this point)

January 2021: Final Meeting and assembling of Yellow Reports

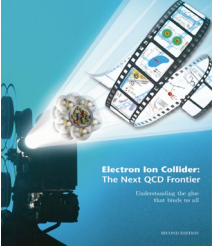
February 2021: review team to look at the reports and comment, independent of editors and authors.

April 2021: Release of Yellow Reports, assign editors that keep report up-to-date



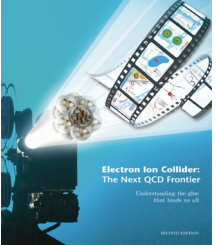
YELLOW REPORT – 16/10 riunione RL-EIC_NET

- Messaggio EIC_NET all'SC
 - Nostra riflessione comune sui subgroups
 - vanno bene come raggruppamenti, ne macano ...
 - Nostra proposta di lavoro nei subgroups
 - Nostre proposte (se ne abbiamo) per contribuire a subconvener e convener
- Allo scopo, necessita' di definire almeno in prima battuta le line di intervento nel campo hardware (next slide)
 - Speravo di iniziare questi discorsi a Bari, ma il calendario gioca contro



YELLOW REPORT – 16/10 riunione RL-EIC_NET

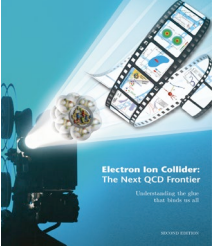
- Ad oggi, in EIC_NET, siamo 40 persone fisiche
 - Suggesto di contribuire per una comunita' di circa 50 persone
 - piu' in la', possiamo ampliare l'intervento (Eugenio ha anticipato una compagine di 100 persone)
- Regole di strategia
 - Hardware: contributo su max 3 item
 - Se ci disperdiamo, portiamo poco e contiamo poco
 - Su nessun item solo europei
 - serve la controparte oltre oceano, anche per motivi pratici
- Evitiamo item che richiedono troppe e continue interazioni con I macchinisti
 - C'e' di mezzo un oceano
 - Dunque eviterei polarimetry, luminometry, ZDC, roman pots
- Teniamo conto dei settori in cui abbiamo ampio expertize progresso e la compagine americana e' meno coperta



YELLOW REPORT – 16/10 riunione RL-EIC_NET

Andando nel concreto, per l'hardware

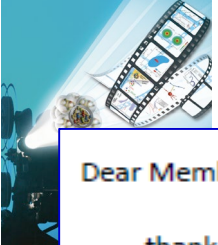
- Rivelatori di vertice
 - Competenze uniche e prospettive anche piu' spettacolari da ALICE
- PID
 - Ampie competenze pregresse (ALICE, CLASS12, COMPASS)
 - Insufficienti forze in USA
 - in particolare, situazione non ben definita per PID alto momento
 - Incertezza sui fotorivelatori
 - In seguito, dobbiamo definire i settori del PID in cui intervenire
- Streaming read-out
 - E' sicuro una necessita'
 - Molto sviluppo si puo' fare da remoto
 - INFN promotore del lavoro



YELLOW REPORT – 16/10 riunione RL-EIC_NET

Andando nel concreto, per il software

- 3D nucleon / nucleus structure, in particular TMDs
- Spectroscopy, possibly with an improved title
 - "jet cosmology" or "jets and heavy flavours"
- diffractive physics , wherever it is included



e-mail EIC_NET → EICUG-SC

Dear Members of the EICUG - SC,

thank you for your effort in promoting the preparation of an EIC-dedicated Yellow Report.

As you know, the EIC_NET collaboration groups the INFN experimentalists with on-going or starting activities for EIC and the collaboration is recognized and supported by INFN.

The EIC_NET community has analyzed the document about the YR preparation circulated by you and comes back to you with the following comments and suggestions, hoping to contribute to the process in this initial phase.

More comments can come in the following steps.

about "APPROCH"

We consider the proposed approach globally valid.

Here, we have three comments/suggestions:

- about the list of subgroups in the sector "Physics", there are physics field of interest that look transverse respect to more than 1 subgroup in the present list; a typical example being the studies of diffractive physics; a mechanism to take this into account is needed;
- about the list of subgroups in the sector "Physics", concerning the subgroup shortly called "spectroscopy", a name better reflecting the richness of the field can be worked-out; for instance, "jet cosmology" or "jets and heavy flavours";
- in general, both in the sector "Physics" and in the one "Detectors", several subgroups are a bit too wide with diversified items: in general, more than 1

single subconvener for each subgroup could be appropriate.

about "MANPOWER"

After an internal (initial) survey, these is a tentative list of subgroups to which we can contribute:

Physics:

3D nucleon / nucleus structure, in particular TMDs Spectroscopy, possibly with an improved title diffractive physics , wherever it is included

Detectors:

Vertexing
PID
DAQ

Moreover, if useful, we can also contribute at the level of more heavy tasks as

- 1 convener for the Detector Group
- subconveners for TMDs, spectroscopy, PID, Vertexing and DAQ;

about "MEETINGS" and "TIMELINES"

The concrete possibility of contribution from a remote (respect to US) community, stays in announcing the event calendar well in advance. The Italian community will be very poorly contributing to the kick-off meeting (we will try some effort)

because announced so late and coming at the end of the year, when traveling money is mostly exhausted. By the way, no date and place have been communicated yet, making it every day more difficult to attend.

This is already a severe bias for us in front of a meeting with important central goals, in particular

(quoting from your document):

"Split in parallel sessions (physics, detector, optional accelerator) for further organization sessions. Discuss who is doing what, and what are the foreseen timelines and activities of the subgroups." All these considerations were anticipated at the recent EICUG - IB meeting.

Therefore, we suggest a complete calendar as early as possible and suggest to take into account, in preparing this calendar, of economic considerations: places not too difficult to reach from Europe, cheap accommodation.

Tor