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CANADA'S NATIONAL LABORATORY FOR PARTICLE AND NUCLEAR PHYSICS

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ISAC beam delivery overview

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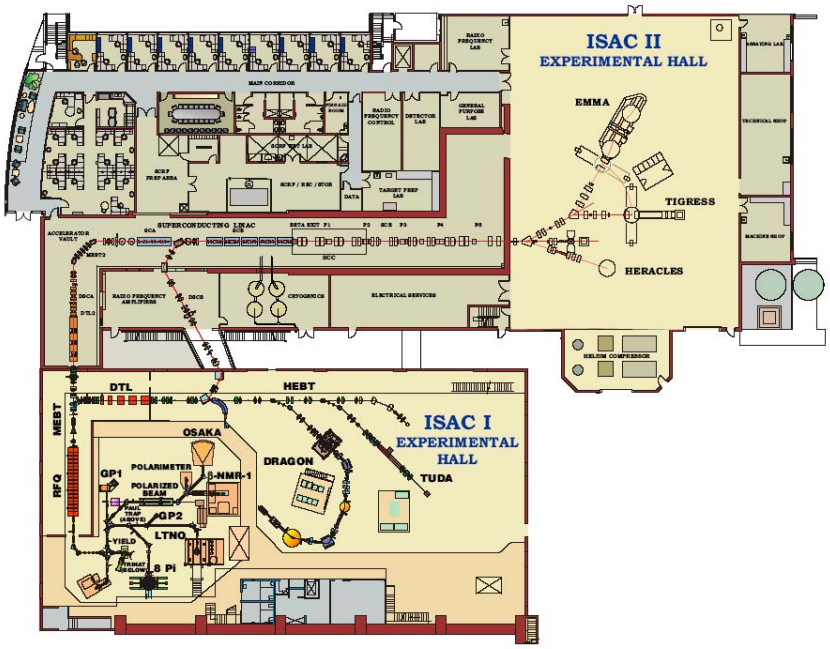
LABORATOIRE NATIONAL CANADIEN POUR LA RECHERCHE EN PHYSIQUE NUCLÉAIRE ET EN PHYSIQUE DES PARTICULES

Propriété d'un consortium d'universités canadiennes, géré en co-entreprise à partir d'une contribution administrée par le Conseil national de recherches Canada

ISAC program

- Nuclear structure:
  - 8Pi,Tigress,TiTAN,Heracles,SHARC,EMMA,
  - DESCANT,IRIS
- Nuclear Astrophysics:
  - Tuda,Dragon,TiTAN,DSL, ,Tactic
- Symmetries:
  - Trinat, GPS, TiTAN,Laser Spec, Griffin
- Material science:
  - B-NMR,B-NQR



New modus operandi

– From now on the EEC approval process will have two stages:
  - Stage 1:Physics approval
  - Stage 2: Beam shift allocation following a mandatory readiness review consisting of both a beam readiness and an experiment readiness review by a new internal Science/Accelerator committee.

  Stage 2 approval (beam allocation) will be given within a rolling envelope of shifts which should allow us to cover for two consecutive years of beam delivery at the present rate.(400 Shifts worth).
  - The implication being that an experiment with stage 2 approval should find its way on the schedule within a two year timeframe.

December07 EEC review process

- At the December07 meeting, all new proposals followed the new two steps approval process.
- All previous SAP proposals were reevaluated in the context of group priority presentations
- 384 shifts allocated by SAPEEC and 66 B-NMR shifts by MMS committee
- 10 experiments removed from backlog, 6 completed
- For SAP exp: 30 stage 2, 45 stage 1

ISAC beam delivery(2008)

- Cyclotron shutdowns; 13 weeks
- Startup: 4 weeks

- Hi Intensity running: 31 weeks
- Low Intensity running: 4 weeks

ISAC beamtime

- Bl2A beamtime available
  - 5040 hours (420 12h shifts)
    - Beam dev: 120 shifts [2007: 65sch: 21 del]
    - Experiments(300 shifts) [2007 : 278sch:183del)]
  - Overall delivery efficiency: del/sch=66%

ISAC facts

- ISAC Target lifetime: 6*10**20 protons ~ 4.5 weeks at 70μamps (less if many beam interruptions).
- Minimum turn around time 3 weeks
- Beam intensity stability is critical
- Temperature distribution in the target is critical

Where is the pressure coming from?

- Beam development (30% of beamtime):
  - New beams
  - Very intense beams (Nuclear astrophysics)
  - New ion sources
  - New target materials
  - Fast turn around/flexibility
- This is key to our program

Where is the pressure coming from?

- Symmetry program:
  - Actinide target
  - Long runs
  - Systematics investigations
  - Dedicated set up, multiples runs with varied conditions
  - Analogy with TWIST or Pienu
  - Safety/Licence requirements
  - Target production, target handling/ α-emitters handling

Where is the pressure coming from?

- Nuclear Astrophysics(radiative capture):
  - Long runs (low cross-section)
  - Intensity limited
  - Contamination
  - Actinide target, E-Linac
- Nuclear structure:
  - Exoticity (actinide target)
  - Beam quality
  - Contamination

Where is the pressure coming from?

- Material science:
  - Easy beam to produce (8Li, 11Be)
  - Stable (routine?) operation
  - Short runs
  - Many samples
  - Temperature, Field dependence
  - Limited by beam time availability
  - Cannot expand to a full user program

Actinide target status

- Safety report for test submitted to CNSC
  - <2μamps beam intensity
  - Up to 300μamps-hours integrated current
- CNSC pre-review March 26
- Modifications to radiation monitoring in place (α-emitters detection)
- Target preparation laboratory in place
- Target material available? Will use UO_2
- 4 weeks of tests scheduled (Aug-Sept 2008)

Conclusion

- Must provide more beamtime to users and beam developers.
- Large investments in instruments not used efficiently. Presently running one experiment at a time.
- Large community awaiting beamtime.

NSERC and NRC support appreciated
DOE/NSF/PPRC/IN2P3/CEA/MEXT

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ISAC experiments status

Shift situation	delivered up 31 dec07	Schedule 111 sch	Schedule 111 del	Schedule 112 sch	Schedule 112 del
Nuclear structure	348	122	90.5	35	24
Nuclear Astrophysics	284	10	3	16	5
Symmetries	179	0		28	20
Material Science	204.5	27	19	40	22
	1015.5	159	112.5	119	71
Beam Dev		(49)	5	16	16