# MUSAC

Report from the 1st meeting

Held at KEK Feb 7Th 2003

# MUSAC membership

- J. Akimitsu (Aoyama Gakuin U) KEK-IMSS Exec.Comm. Member
- S. Ikeda (KEK) KEK-IMSS Exec.Comm. Member
- Y. Ikeda (JAERI) J-PARC MFLG Leader

- M.Iwasaki (RIKEN) Muon Science Exp. Specialist
- Y. Miyake (KEK) J-PARC MLFG-Muon Sub-leader

- K. Nagamine (KEK) KEK-IMSS-MSL Head, KEK-IMSS Exec. Comm. Member

  N.Nishida (Tokyo Ins. Tech.) KEK-IMSS Exec. Comm. Member
- Y. Yamazaki (JAERI) J-PARC Acc. Div. Leader
- H. Yasuoka (JAERI) Condensed Matter Experiment Specialist
- R. H. Heffner (Los Alamos Lab.) ISMS President, Muon Science Exp. Specialist
- C. Petitjean (Paul Scherrer Inst.) J-PARC IAC Member
- L. I. Ponomarev (Kurchatov Inst.) Muon Science Theory Specialist
- J. M. Poutissou (TRIUMF Lab.) J-PARC IAC Member
- Observers: J.Sonier and R.Cywinski Vice-presidents of ISMS

# From the March 2002 report of IAC

- Muon Science Facility:
- ….**We recommend** that proposals,selection and design of such dedicated facilities and/or experiments should now be started by the Japanese experimental (and International) community so that the design of the proton target station does not preclude the optimization of muon facilities…..

# Muon Facilities

- Pulsed sources
  - ➢ISIS 800MeV,200μa
  - ➢KEK 500MeV, 5μa
  - ➢J-PARC 3 GeV, 333μa
- DC sources
  - ❖PSI 590 MeV, 2 ma
  - ❖TRIUMF 500MeV,150μa

# J-PARC Muon Facilities

- 4 muon channels off one production target in tandem with the neutron source:
  - Conventional Decay/surface channel
  - Surface muon channels
  - High momentum channel
  - High acceptance channel: Dai-Omega type

  (for Sub-keV muons, Microbeams…..)

❖ Target thickness limited by neutron flux losses

# Technical Issues

- Isotropic Carbon , edge cooled ,3.3KW
- Remote handling
- Air activation
- Water activation
- Shielding requirements
- Reliability

# Technical Issues

- Coordination at Engineering level with Neutron source Engineering
- Coordination with proton beam designers on beam parameters requirements ( size, time width, position stability..) and beam monitoring
- Installation of front end of all four channels best done before  first activation.

# Science reach

- Muon Spin rotation/relaxation/resonance ( MuSR type experiments)
- Muon catalyzed fusion
- Fundamental muon physics

# Muon Science: MuSR

- Unique high intensity  pulsed source
- Unique Low energy muon capability ( Super Dai-Omega channel)
- New instrumentation and Techniques
- Strong active young community
- Good linkages with material science
- Synergy with neutron users ( a la ISIS/PSI..)

# Muon Catalyzed Fusion(MuCF)

- Explore the Temperature/Pressure phase space for MuCf in H/D/T mixtures
  - Basic few body reactions
  - Applications
- High energy muons
- Strong community
- Theoretical support

# Fundamental Muon science

- Muon life time: CPT test
- Muon molecules
- Muonium spectroscopy
- Muonic atom spectroscopy

- “Tailored made” muon beams and facilities
- (Rare decay program at to the 50 GeV synchrotron mainly)

# Observations and Recommendations

- Rich Physics potential with an active and enthusiastic community
- Coordination of technical effort with Neutron source. Standardization
- R/D on production target and validation of the conceptual design.
- Strong support for a Super Omega type channel: Need to evaluate the Dai-Omega performance
- Need for more formal letters of Intent to influence the design of the facility.
- Start R/D on advanced Instrumentation in the Universities.
- Need to solve the funding shortage for shielding to allow for an early start
- Initial minimal program could give the first physics publications at J-PARC.