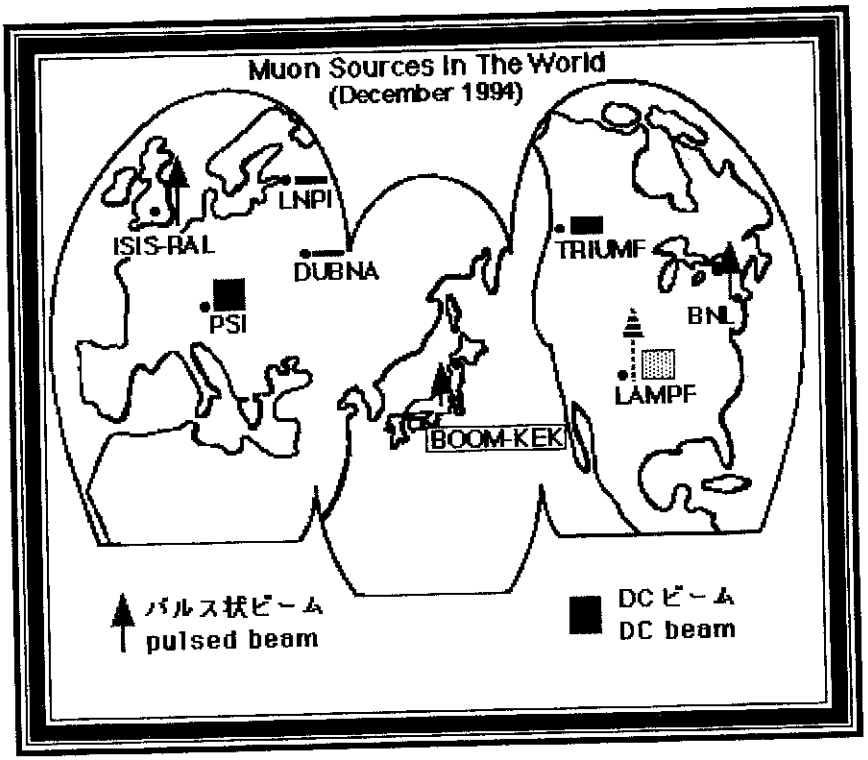

- **TRIUMF survey of muon beams**
- **Comparison of muon rates in various beamlines**
- **Mega beam line at LAMPF (now called LANCE)**

  This beamline has been decommissioned and may be available. Contactperson: Martin Cooper, 505-667-2929, mcooper@lanl.gov

  Three pages from the LAMPF Users Handbook.

  This beam was designed by Pat Thompson, now at BNL/RHIC, 516-344-7635.

  See, P.A. Thompson et al, `The Stopped Muon Channel at LAMPF', NIM 161 (1979) 391-411.

- **BNL D Line**

  The "Gif image" includes the D2 muon channel

- **Muon beam lines at the Paul Scherrer Institute**

  1. μE1 beam line

  2. μE4 beam line

- **TRIUMF M-20 beam line**
- **The M-arena of the Japan Hadron Project at KEK**
- **The RIKEN-RAL Muon Facililty**

Photograph and key.

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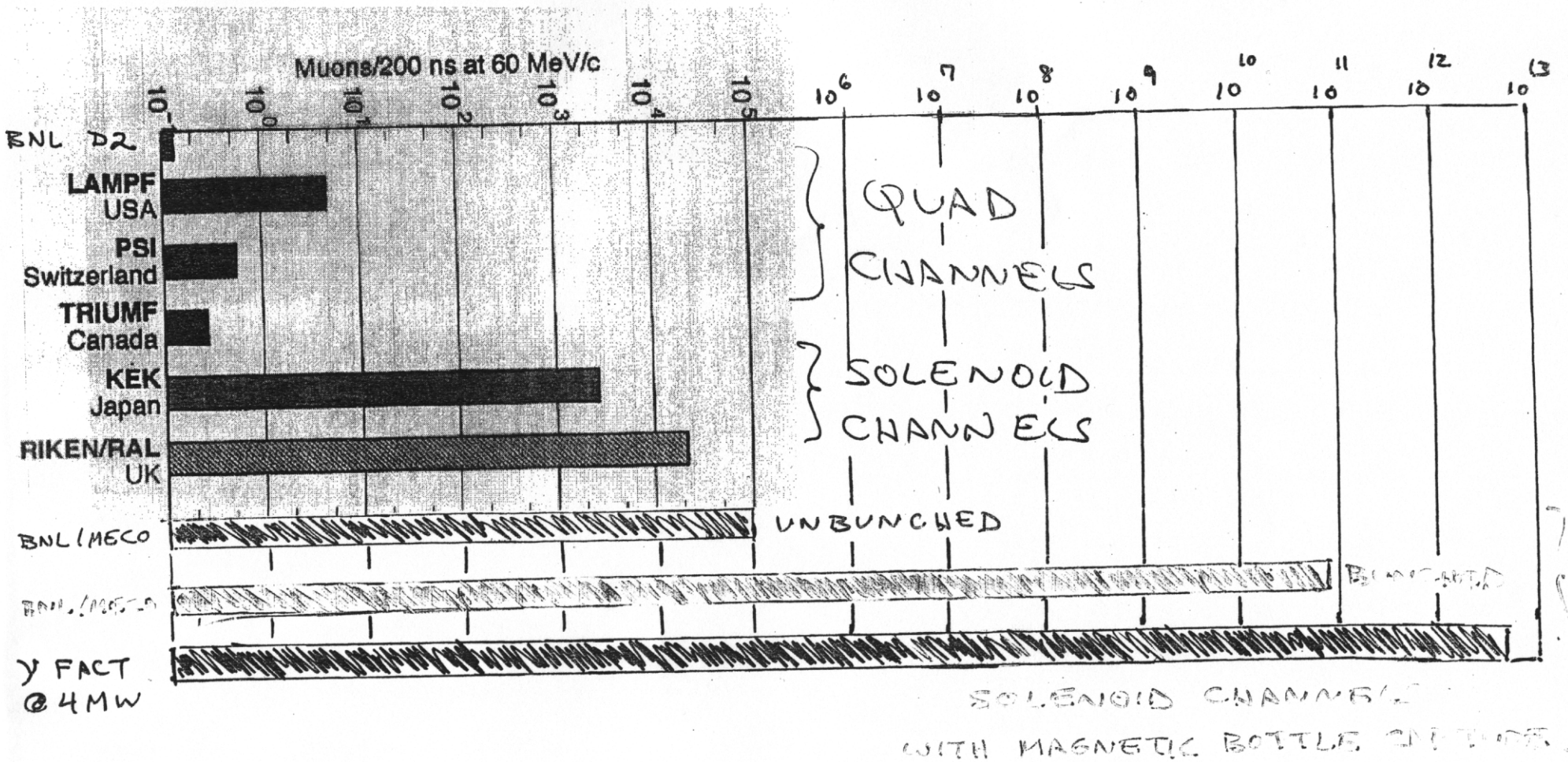
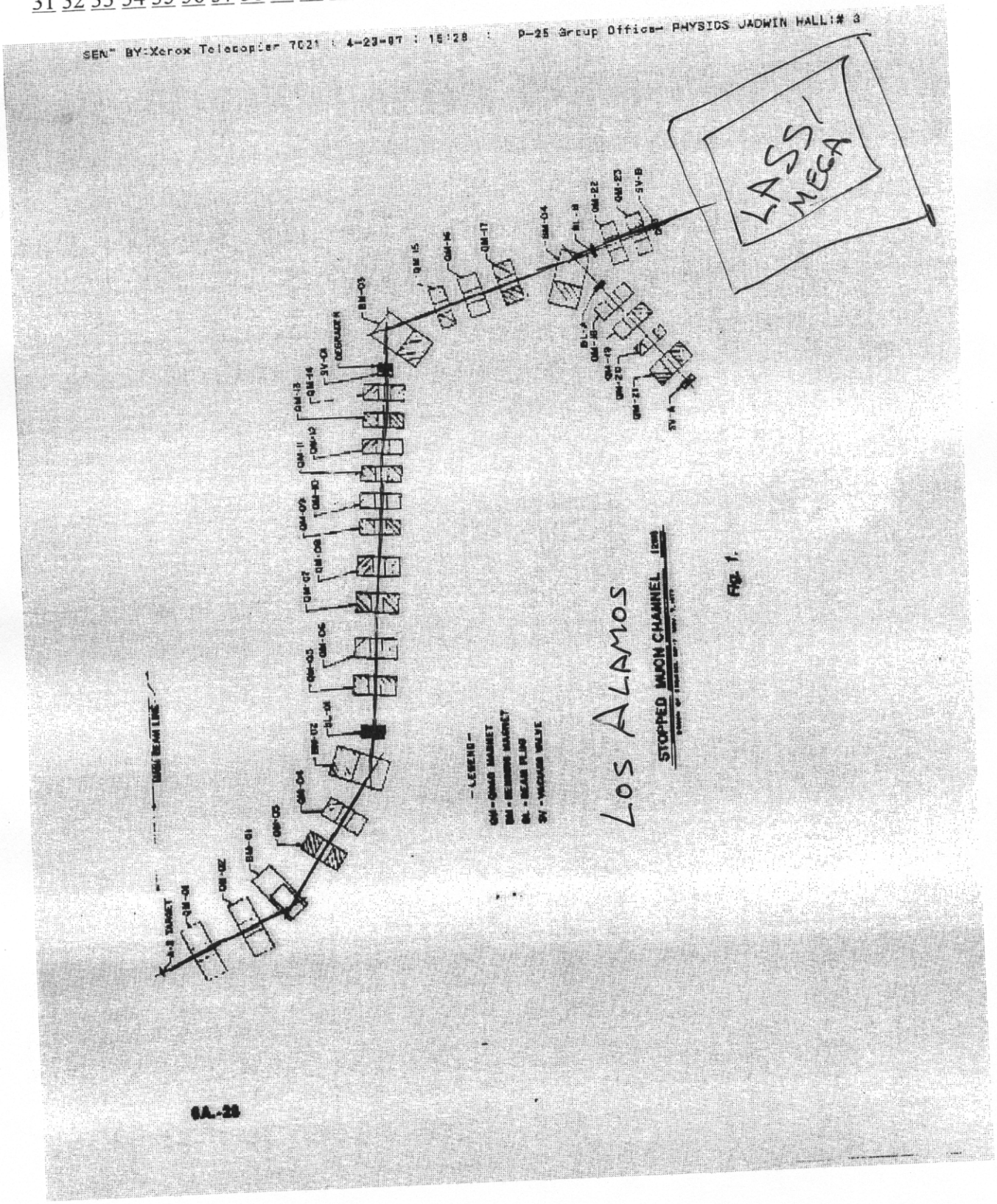
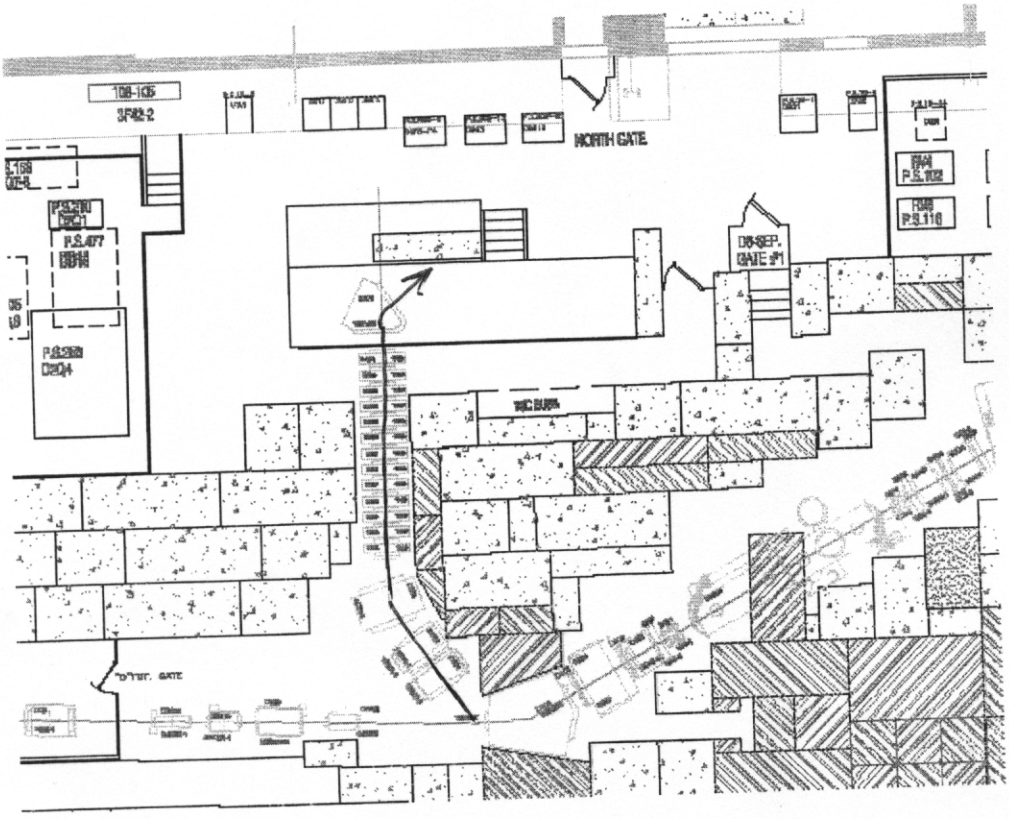
Fax: +1-609-258-6360


Muons/200 ns at 60 MeV/c
10^{-1}
10^{0}
10^{1}
10^{2}
10^{3}
10^{4}
10^{5}
10^{6}
10^{7}
10^{8}
10^{9}
10^{10}
10^{11}
10^{12}
10^{13}
BNL D2
LAMPF
USA
PSI
Switzerland
TRIUMF
Canada
KEK
Japan
RIKEN/RAL
UK
QUAD
CHANNELS
SOLENOID
CHANNELS
UNBUNCHED
BNL/MECO
BNL/MECO
Y FACT
@4MW
SOLENOID CHANNELS
WITH MAGNETIC BOTTLE

Page 2

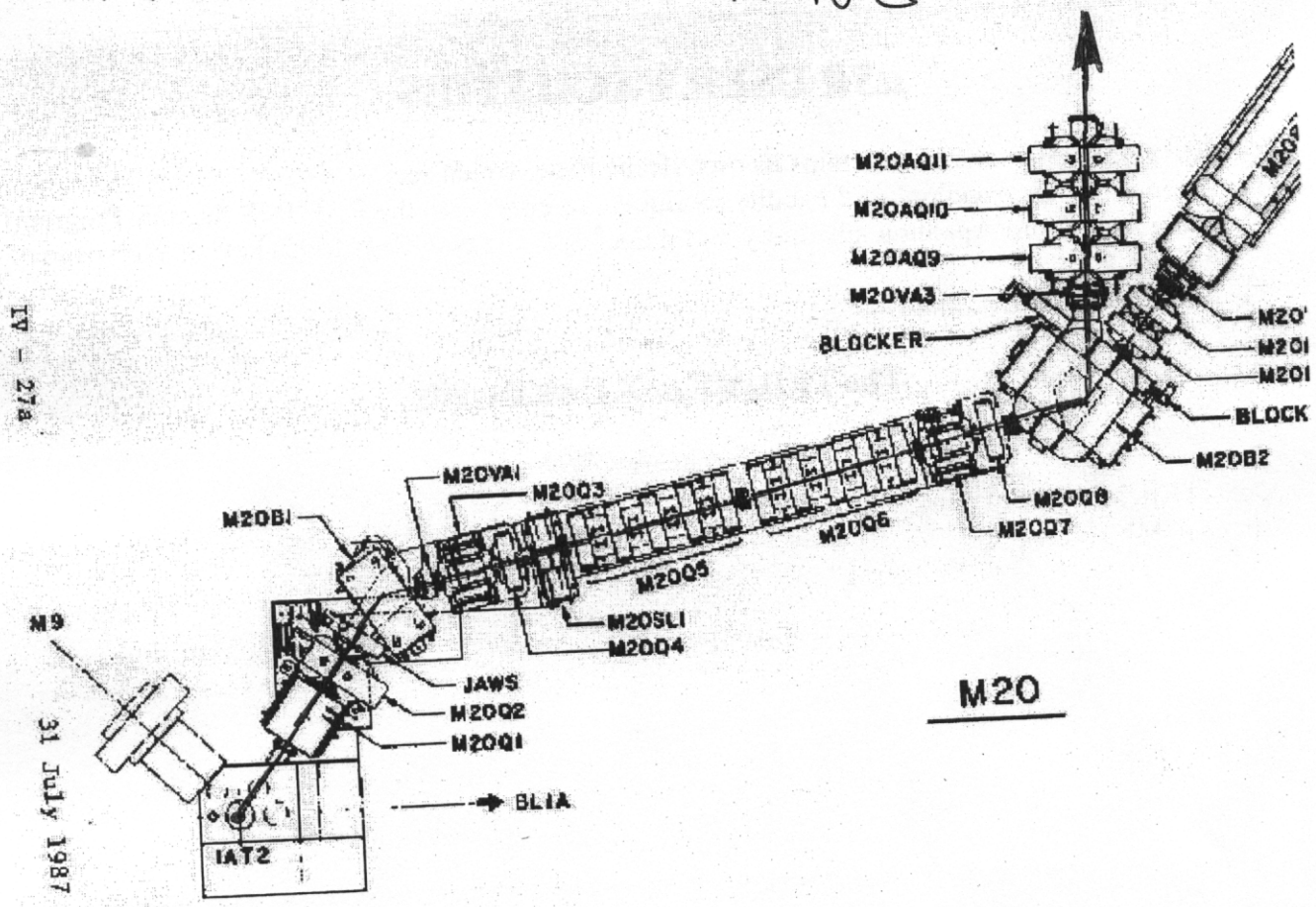
Muon beam page | back one slide | forward one slide
01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60



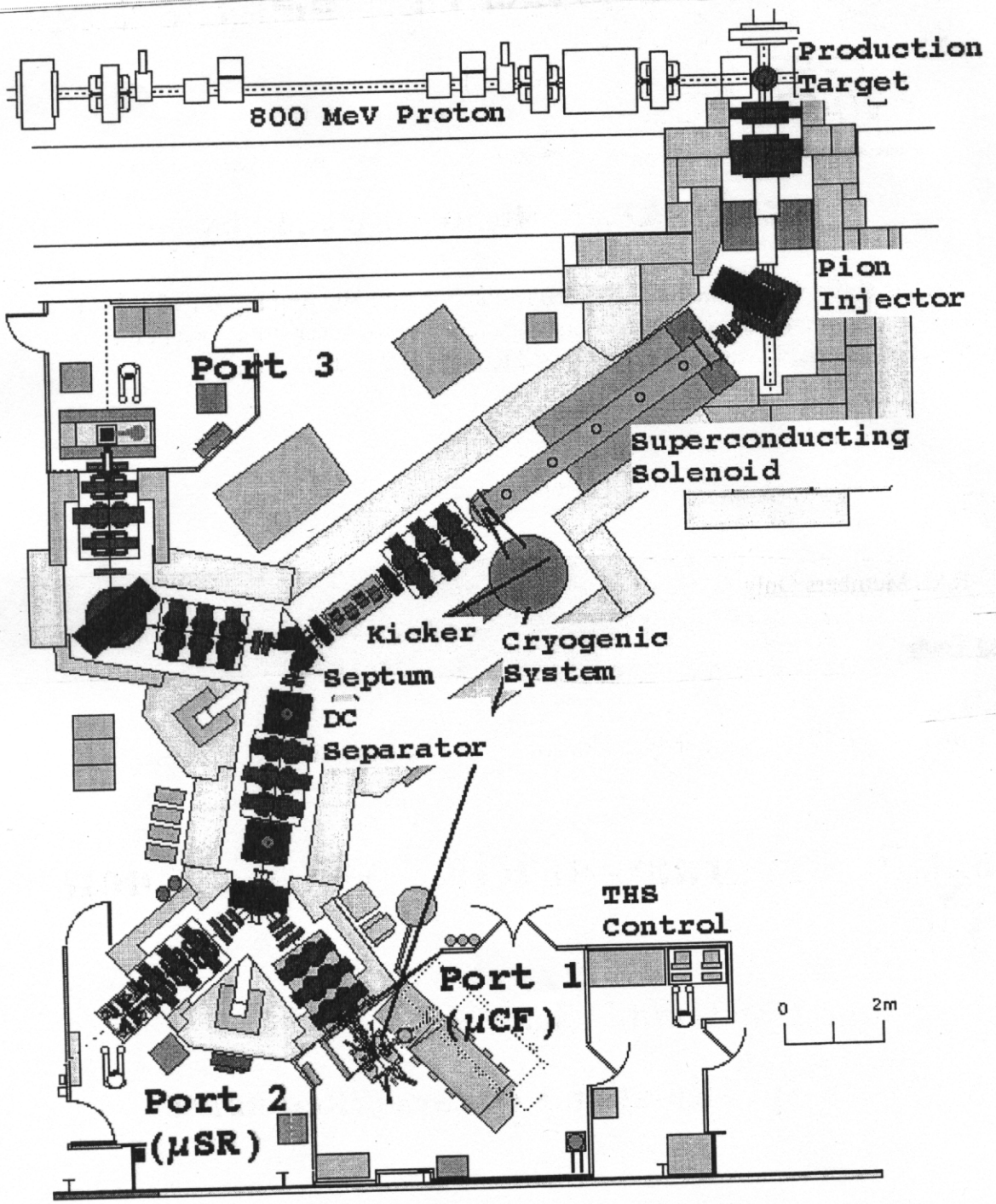


BNL D2 LINE

TRIUMF M20 LINE



Welcome to the RIKEN-RAL Muon Facility!



RIKEN-RAL Muon Facility

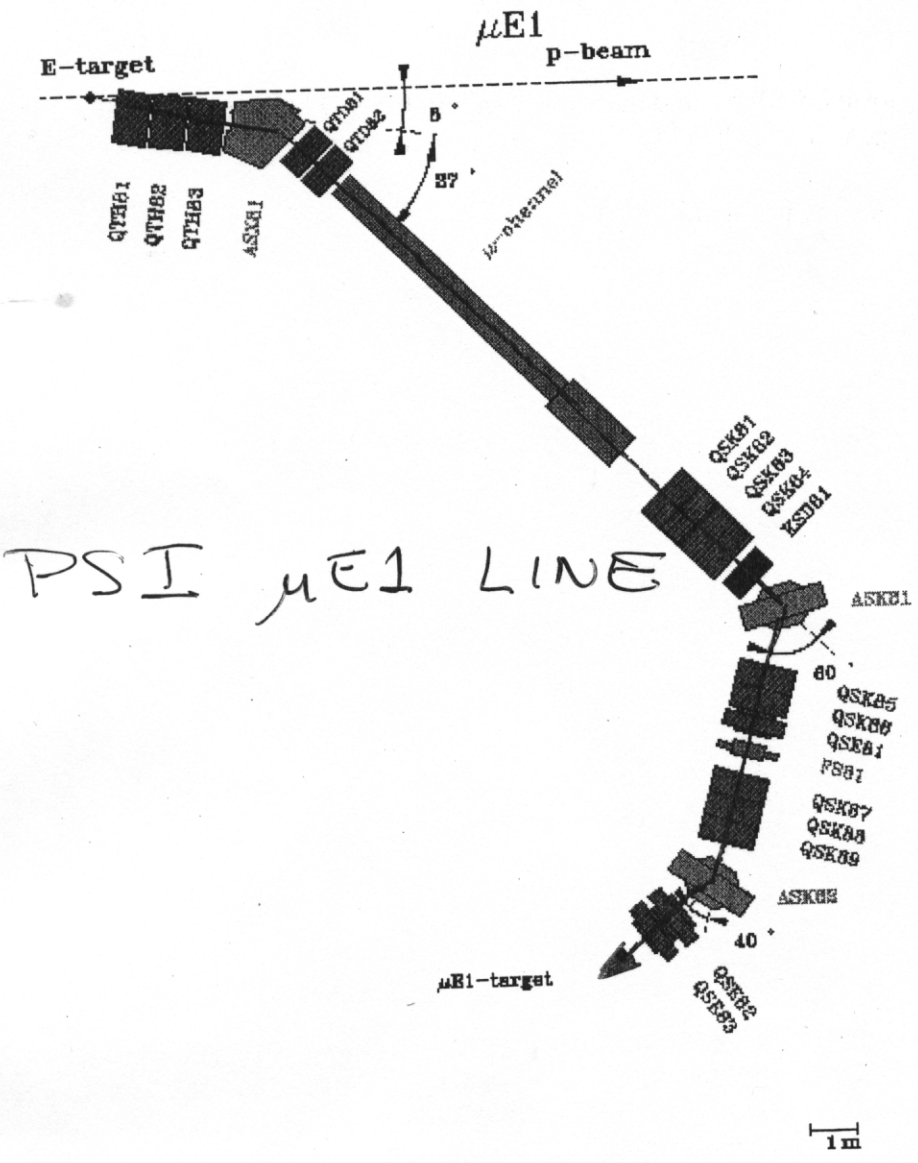


Fig 1 : Magnetic elements in μE1 beam line

μE1 beam line

The μE1 is an experimental area for an intense medium energy polarized muon beam, with very low pion and electron contamination. As in the case of the piE1 beam line, pions from the thick target **TE** are extracted at an angle of 10° in the forward direction using a triplet of half quadrupoles. The beam line consists of three sections

- a pion collection section
- a long superconducting solenoid
- the muon extraction

The main characteristics of the beam line are listed in the following table, and a layout of the experimental area and of the magnetic components are shown in Fig 1 and Fig 2

Table 1 : Characteristics of the μE1 beam line

Mode		A	B
Momentum acceptance (FWHM)		3%	1%
Pion momentum range [MeV/c]		200 125	220 125
Muon momentum range [MeV/c]		125 85	125 85
Rate of negative muon [$mA^{-1}s^{-1}$]		6e7 3e7	2e7 1e7
Spot size (FWHM)	horizontal	39 mm	28 mm
	vertical	25 mm	17 mm

Collection and Decay section

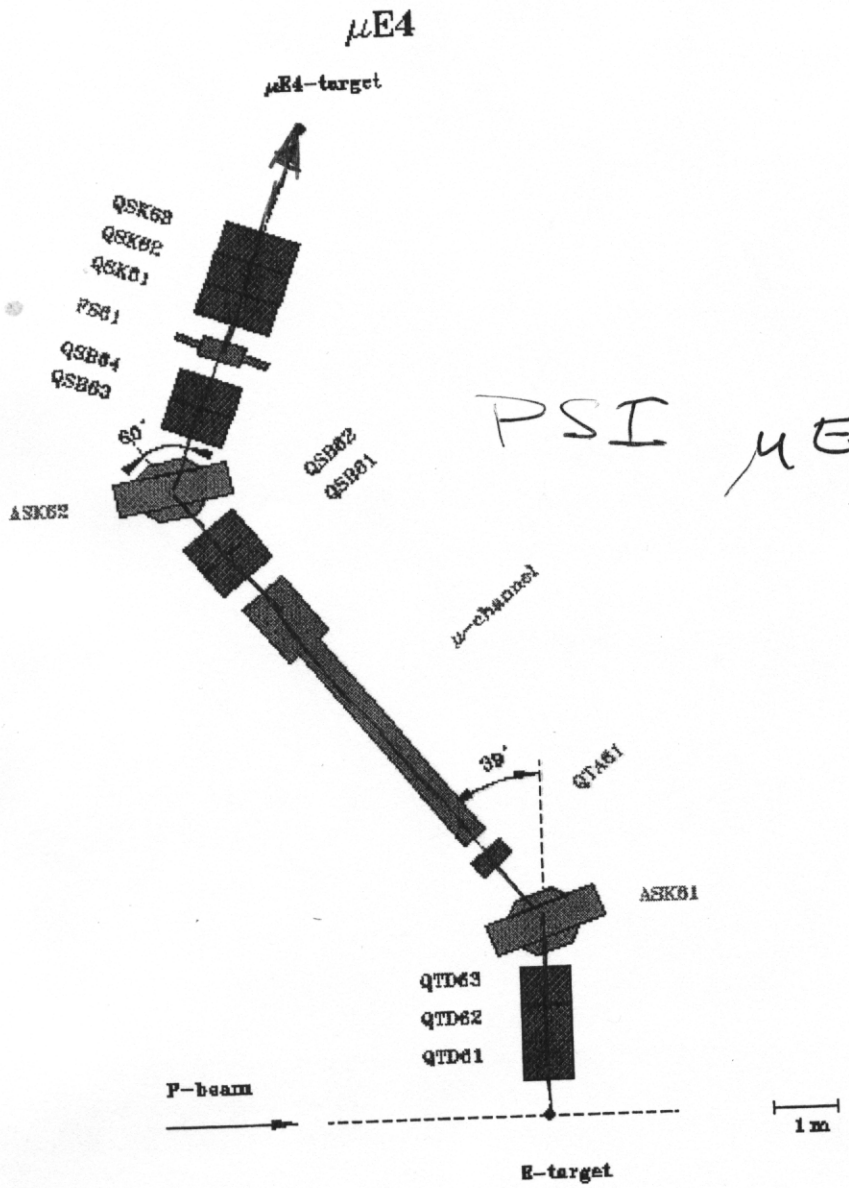
Pions produced at target **TE** are momentum selected by a bending magnet and then focused by a quadrupole doublet onto the entrance of a superconducting solenoid of 8 m length, 12 cm inner free diameter and 5 T field strength. There muons are collected from pions decaying in flight.

The length of the solenoid was choosen in relation to the pion decay length l(pi) [m] = 0.055 × P(pi) [MeV/c].

About half of the pions decay in the solenoid at P(pi) = 220 MeV/c. In this case a broad spectrum of muons is available at the solenoid exit, ranging from 120 to 240 MeV/c.

Extraction Section

The second part of the beam line allows selection of a central muon momentum different from that of the injected pions, preferably at the low momentum edge corresponding to muons decaying backward in the center of mass system. In this case the contamination from electrons originating at the pion production target is very low (e+/μ+ ~5%), and the muon beam polarization reaches a high value around 75%. Two different modes of operation are available :



PSI μE4 LINE

Fig 1 : Magnetic elements in μE4 beam line