How to use the Muon Tracking Monte Carlo at DESY

JADE COMPUTER NOTE 55
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Particles are tracked through the muon filter using the Cascade program due to Alan Grant. The results produced look tolerably like the real thing, though no guarantee is given - various hilarious mistakes have been found in the original code, and I shouldn't think they've all been discovered yet.

Be warned that this program is SLOW! Of the order of 1 second per track, increasing sharply with energy.

The source and load libraries are F22RJB.RLMC.S and F22RJB.RLMC.L. There is a sample program in F22RJB.RLMC.S(*EXAMPLE). It uses default values for various options. The defaults are fairly sensible, if you insist on changing them, read on.

Apart from the hadron cascade, there is also a different treatment of calibration constants. This is necessary because the muon filter studies need more control over the chamber constants being used.

Under the new system the date on which the data is supposed to have been taken is set by the user (not just taken as the day on which the Monte-Carlo job runs). Appropriate calibration data for the chosen date are then loaded from the O'Neill datasets. Note that for chamber constants KALIBR and co. still treat this as Monte-Carlo data and smearing etc. is performed as before.

The default date and time are 1030 am on 1 April 1980. To change this, set values in

COMMON/TODAY/HSEC,HMIN,HHOUR,HDAY,HMONTH,HYEAR

Another change is that input is now done by a seperate subroutine MCREAD This does not affect normal use in any way, but if you want to read a non-standard 4-vector tape, or use an internal 4-vector generator, you can put in your own version of MCREAD.

Control of the muon chamber noise, efficiency, and resolutions is done by the routine MUFIX. This is called by MCJADE, so parameters can be set by the arguments in the subroutine call, or by putting in your own version. The latter way of doing it is used if you want to alter the muon constants after they have been read in - to make some dead chambers actually work, for example. If this is done, then the muon finding in the supervisor should be told about it by calling the same version of MUFIX from USER, after the constants have been read in.

For simple use, the call in MCJADE is

```
CALL MUFIX(SIGT,SIGL,EFF,RANDOM,DEBUG,SIGTEW)
```

where SIGT	is the barrel transverse	resolution	(default 10 mm)
SIGL	is the barrel longitudinal	resolution	(default 500 mm)
EFF	is the chamber efficiency		(default 95%)
RANDOM	is the random noise level		(default 1%)
DEBUG	is a debugging print flag		(default .FALSE.)
SIGTEW	IS THE ENDWALL TRANSVERSE	RESOLUTION	(DEFAULT 15 MM)

Note : Apart from the muon routines, the routines in this version that are different from the standard version are:

MCJADE DATEMC WRTMCB

JCL
===

You must include the extra libraries

F22RJB.RLMC.L
F11LHO.JADEGL
F22ALL.JADEMUL
SYS1.NAGLIB

F22RJB.RLMC.L must be before F22ELS.JMC.L

You also need the calibration datasets in the GO step for units 21 & 22

An example follows. It exists in F22RJB.RLMC.S(#EXAMPLE)

```
//F22RJBMC JOB 10622622,ROGER,MSGLEVEL=(0,0),CLASS=E,TIME=(00,30)
//*MAIN LINES=(10),ORG=EXT,RELPRI=MED
// EXEC FORTHCLG,PARM.FORT='NOSOURCE,XL',REGION.GO=912K
      IMPLICIT INTEGER*2 (H)
      COMMON / BCS / IW(25000)
      COMMON/TODAY/HDATE(6)
C  SET DATE AND TIME OF RUN  - 12 NOON ON 1ST MAY 1981
      HDATE(1)=0
      HDATE(2)=0
      HDATE(3)=12
      HDATE(4)=1
      HDATE(5)=5
      HDATE(6)=1981
      CALL BINT( 25000,5000,100,100)
      CALL MCJADE(10,100)
      CALL BSTA
      STOP
      END
//LKED.SYSLIB DD
//            DD
//            DD DSN=SYS1.NAGLIB,DISP=SHR,UNIT=FAST
//            DD DISP=SHR,UNIT=FAST,DSN=F22ALL.JADEMUL
//            DD DISP=SHR,UNIT=FAST,DSN=F11LHO.JADEGL
//            DD DISP=SHR,UNIT=FAST,DSN=JADELG.LOAD
//            DD DISP=SHR,UNIT=FAST,DSN=F22RJB.RLMC.L
//            DD DISP=SHR,UNIT=FAST,DSN=F22ELS.JMC.L
//            DD DSN=R02BJT.CERNLIB,DISP=SHR,UNIT=FAST
//            DD DSN=F1EBLO.BOSLIB.L,DISP=SHR,UNIT=FAST
//GO.FT03F001 DD DISP=SHR,UNIT=FAST,DSN=F22RJB.MU1
//GO.FT02F001 DD DISP=SHR,UNIT=FAST,DSN=F22RJB.MU2
//GO.FT21F001 DD UNIT=FAST,DISP=SHR,DSN=F11LHO.AUPDAT0
//GO.FT22F001 DD UNIT=FAST,DISP=SHR,DSN=F11LHO.AUPDAT1
```