n_TOF Bologna: Geant4 Simulations

Per aumentare la statistica nelle simulazioni PRT e U235 abbiamo "resuscitato" Geant4 (versione 10.1) sul Cluster Locale INFN Bologna che è costituito da :

- **256 core fisici Intel® Xeon®**
- **CPU E5520 @ 2.27 GHz**
- **Sistema Operativo Scientific Linux 6.4**

I codici MC del PRT e U235 sono stati riscritti per adattarli all'utilizzo delle code "batch".

Questo nostro utilizzo del Cluster è sempre stato «mal tollerato» da ATLAS e CMS della Sezione di Bologna

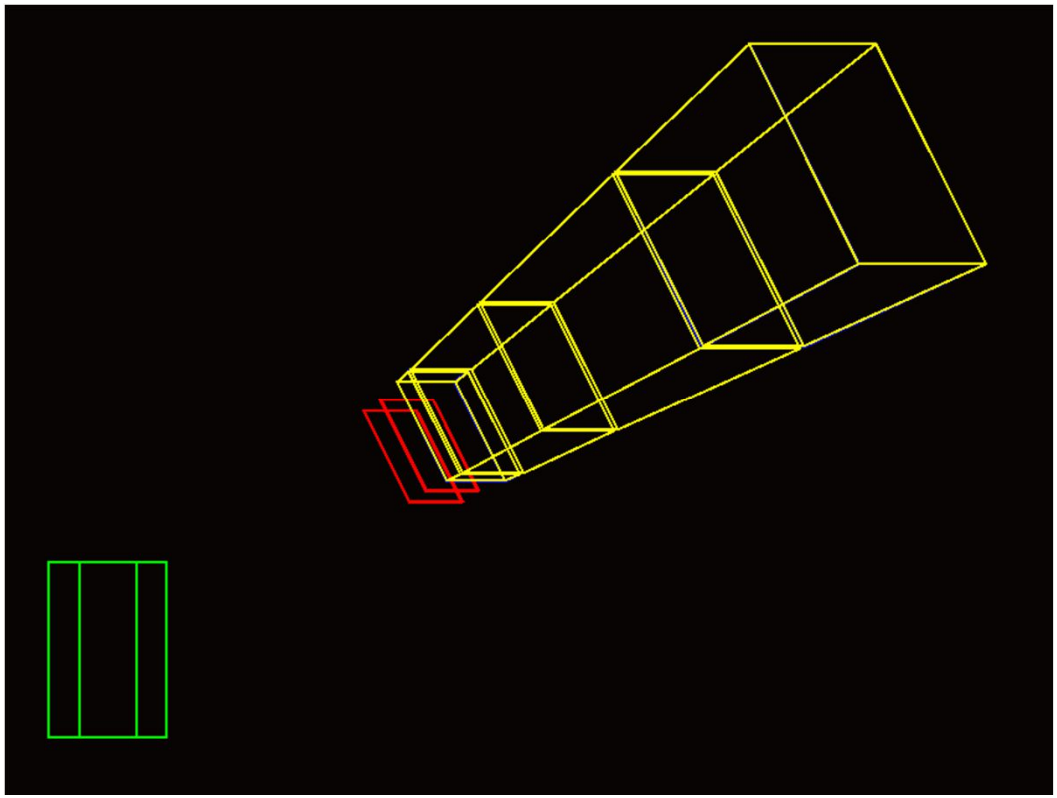
PRT

/testhadr/event/SetDirE PRT_Sergio-build/deposito_69.txt

/testhadr/det/setMat G4_POLYETHYLENE
/testhadr/det/setSize 10mm

/control/verbose 0
/run/verbose 0
/tracking/verbose 0
/testhadr/CutsAll 0.006 mm
/testhadr/Physics FTFP_INCLXX_HP
/testhadr/Physics emstandard_opt0
/run/initialize

/control/execute model_gaus_40.mac
/run/beamOn 5000000



≈10 volte 136 Macro da 5×10^6 neutroni delle seguenti energie (MeV): 30, 40, 50, 60, 80, 100, 120, 150, 200, 300, 400, 500, 600, 700, 800, 900, 1000.

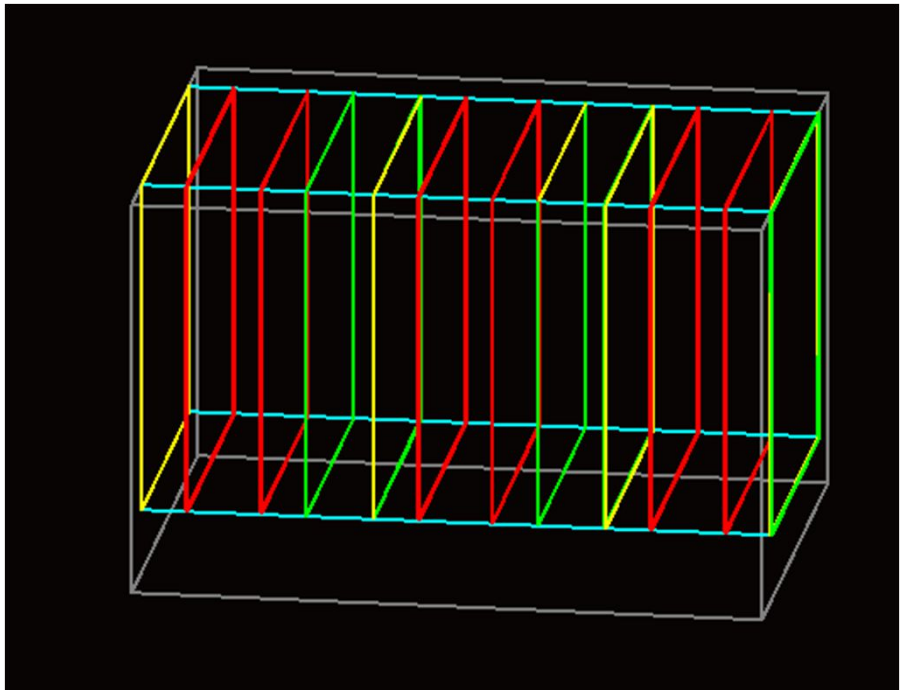
Materiali usati: G4_C (1 mm, 5 mm), G4_POLYETHYLENE (2 mm, 4 mm, 10 mm) e H_Lucia (2 mm, 4 mm, 10, mm)

U235

/testhadr/SetDir U235-build/T3in_69.txt
/testhadr/SetDir2 U235-build/T3out_69.txt
/testhadr/SetDirbis U235-build/T4in_69.txt
/testhadr/SetDir2bis U235-build/T4out_69.txt
/testhadr/SetDir5 U235-build/T9in_69.txt
/testhadr/SetDir6 U235-build/T9out_69.txt
/testhadr/SetDir7 U235-build/T10in_69.txt
/testhadr/SetDir8 U235-build/T10out_69.txt
/testhadr/SetDir9 U235-build/T15in_69.txt
/testhadr/SetDir10 U235-build/T15out_69.txt
/testhadr/SetDir11 U235-build/T16in_69.txt
/testhadr/SetDir12 U235-build/T16out_69.txt
/testhadr/event/SetDirE U235-build/deposito_69.txt
/testhadr/tracking/SetDirT U235-build/hadronic_69.txt

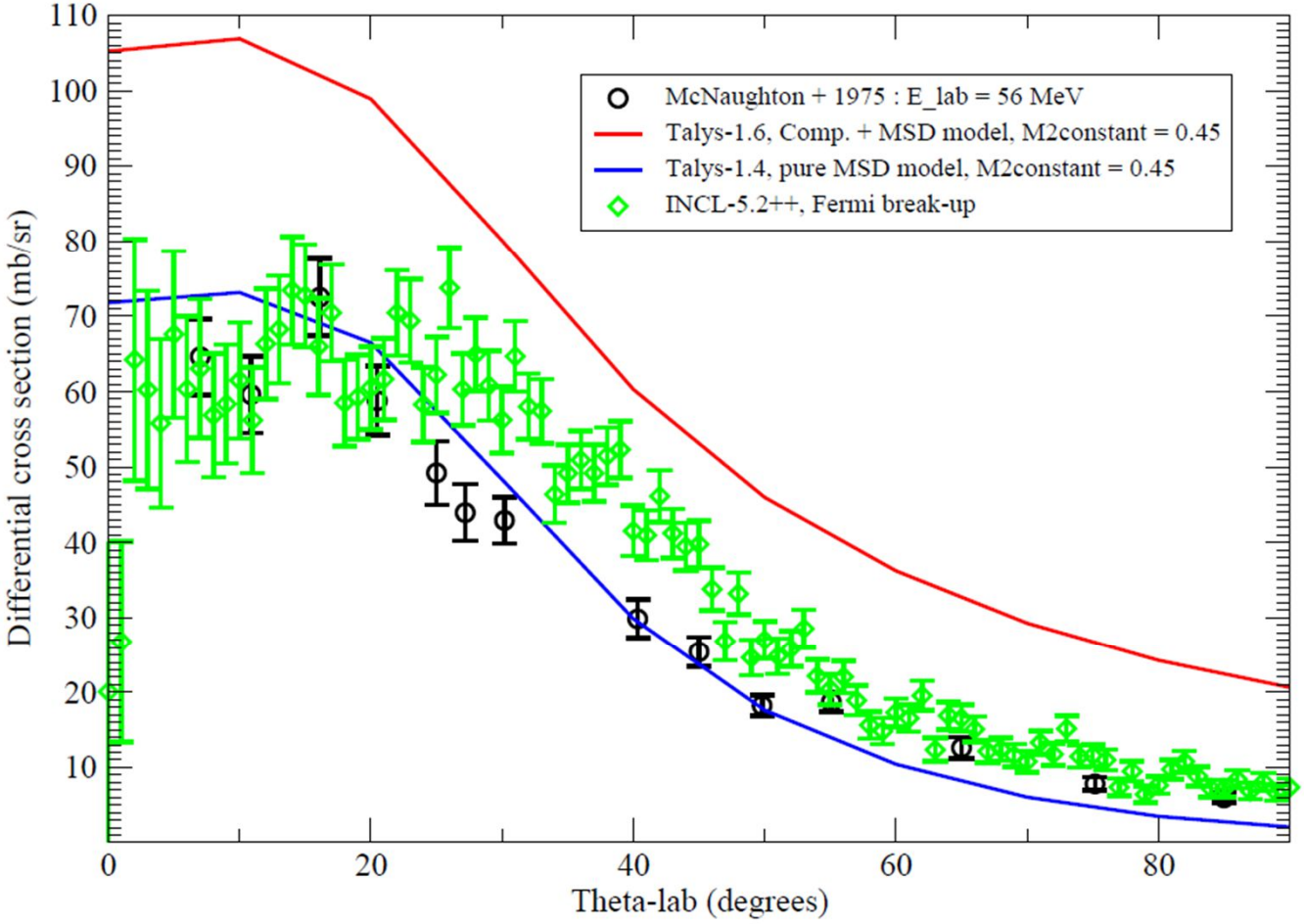
/control/verbose 0
/run/verbose 0
/tracking/verbose 0
/testhadr/CutsAll 0.006 mm
/testhadr/Physics FTFP_INCLXX_HP
/testhadr/Physics emstandard_opt0

/run/initialize/control/execute gun_u235.mac
/run/beamOn 500000

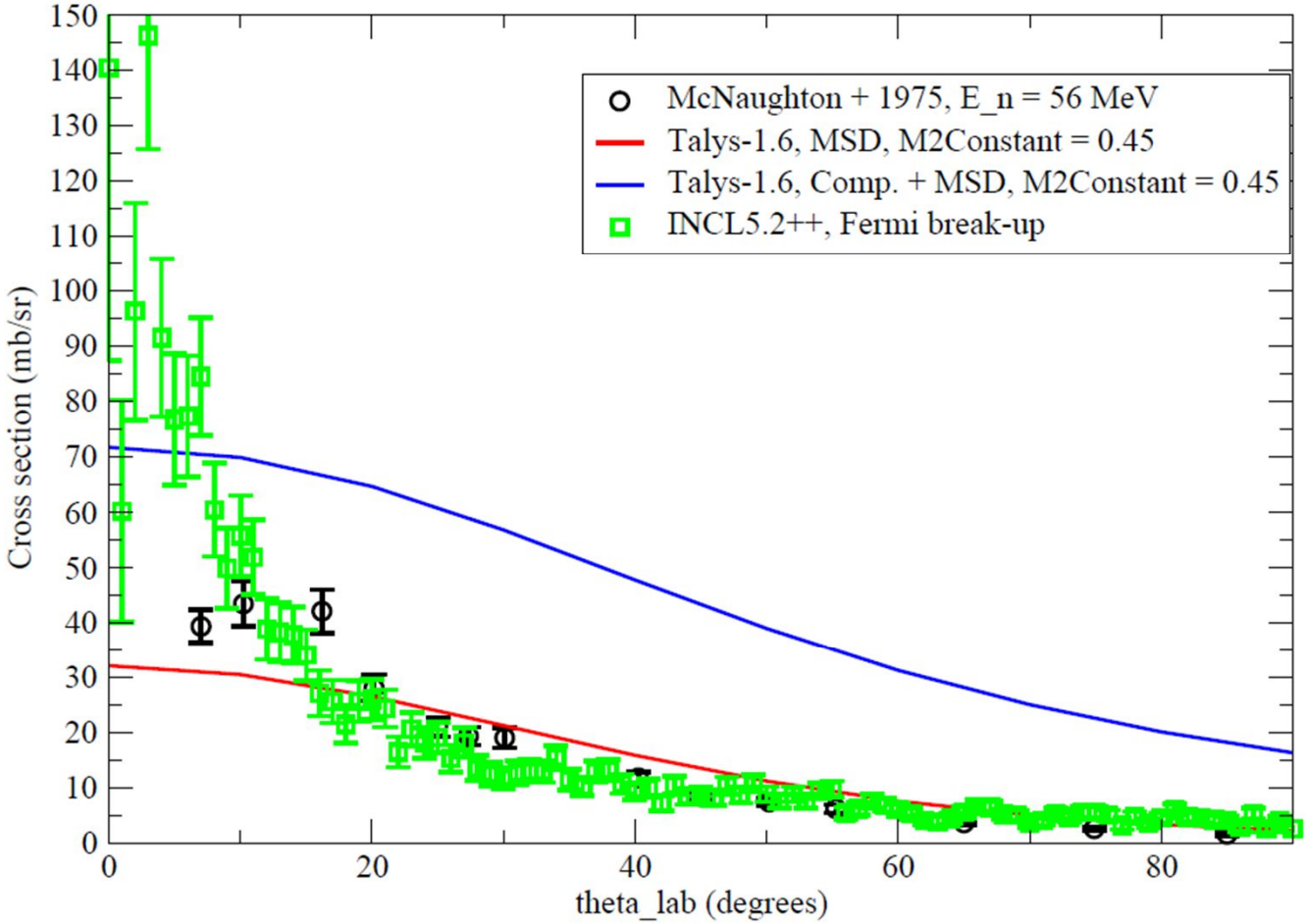


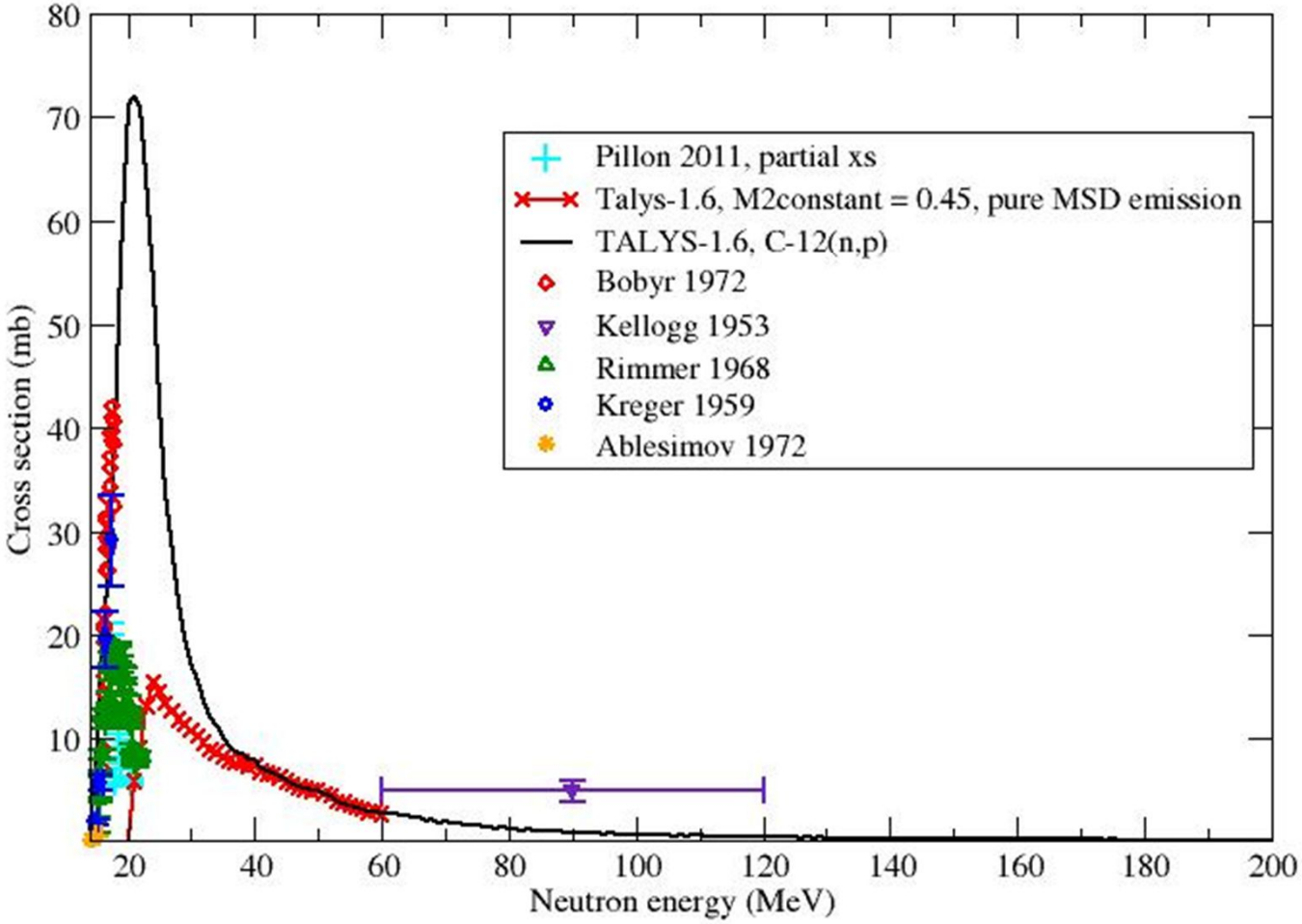
≈10 volte 1000 Macro da 5 ×10^5 neutroni termici per U235

C-12(n,p)


McNaughton + 1975 : E_lab = 56 MeV
Talys-1.6, Comp. + MSD model, M2constant = 0.45
Talys-1.4, pure MSD model, M2constant = 0.45
INCL-5.2++, Fermi break-up
Differential cross section (mb/sr)
Theta-lab (degrees)
110
100
90
80
70
60
50
40
30
20
10
0
20
40
60
80

C-12(n,d)


McNaughton + 1975, E_n = 56 MeV
Talys-1.6, MSD, M2Constant = 0.45
Talys-1.6, Comp. + MSD, M2Constant = 0.45
INCL5.2++, Fermi break-up
Cross section (mb/sr)
theta_lab (degrees)
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
0
20
40
60
80


Pillon 2011, partial xs
Talys-1.6, M2constant = 0.45, pure MSD emission
TALYS-1.6, C-12(n,p)
Bobyr 1972
Kellogg 1953
Rimmer 1968
Kreger 1959
Ablesimov 1972
Cross section (mb)
Neutron energy (MeV)
80
70
60
50
40
30
20
10
20
40
60
80
100
120
140
160
180
200