

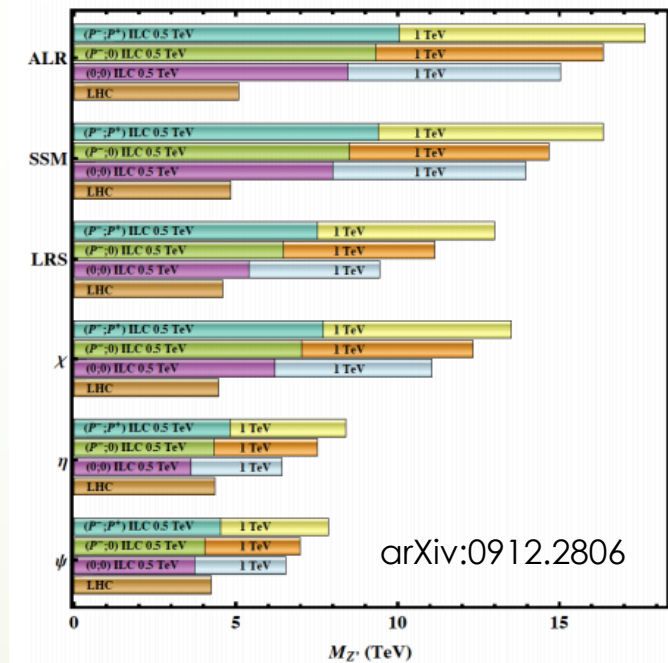
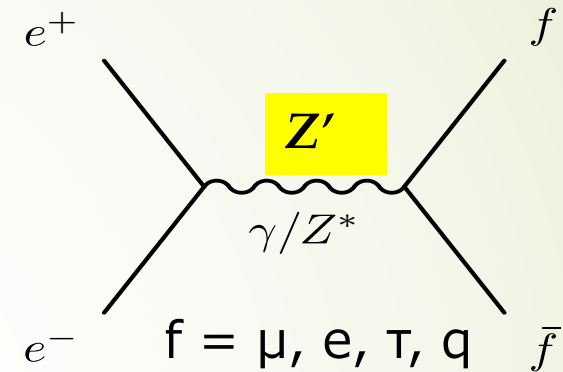


2-fermion process

Hiroaki Yamashiro (Kyushu University)

Purpose of 2-fermion process study

- Purpose : Search of heavy neutral gauge boson Z'
- @ILC
 - Measure interference effect
 - Zff coupling, angular, distribution etc..
 - Determinate new physics model
- Favorable at more than 500 GeV, but certainly meaningful starting from 250 GeV



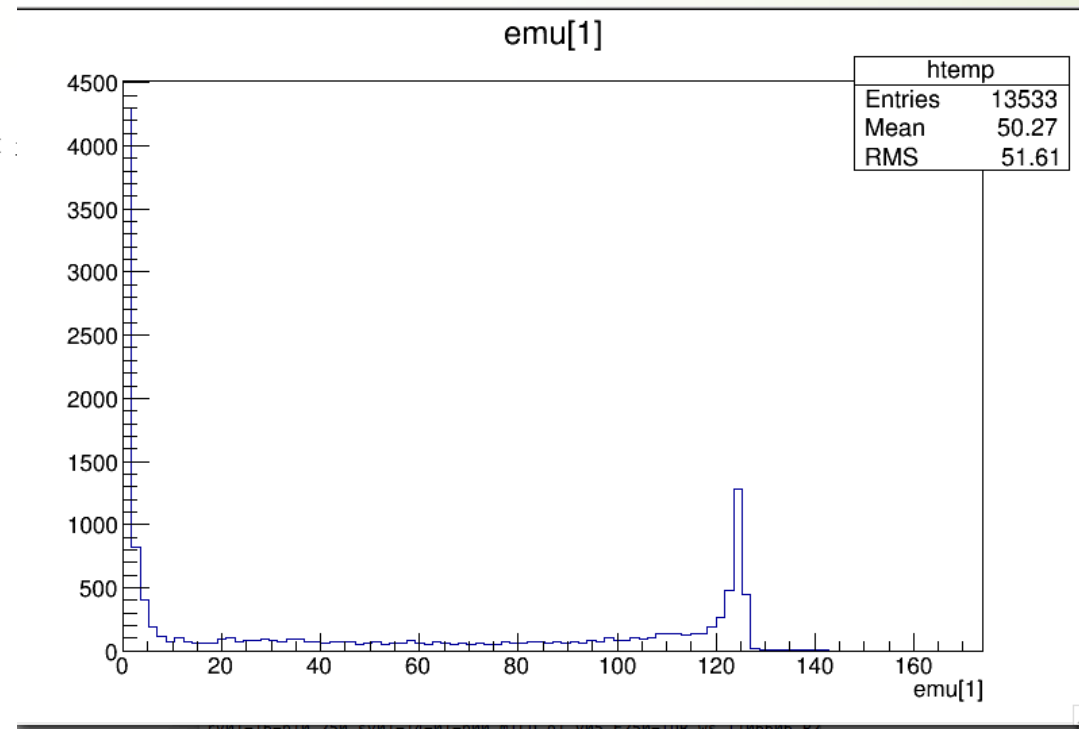
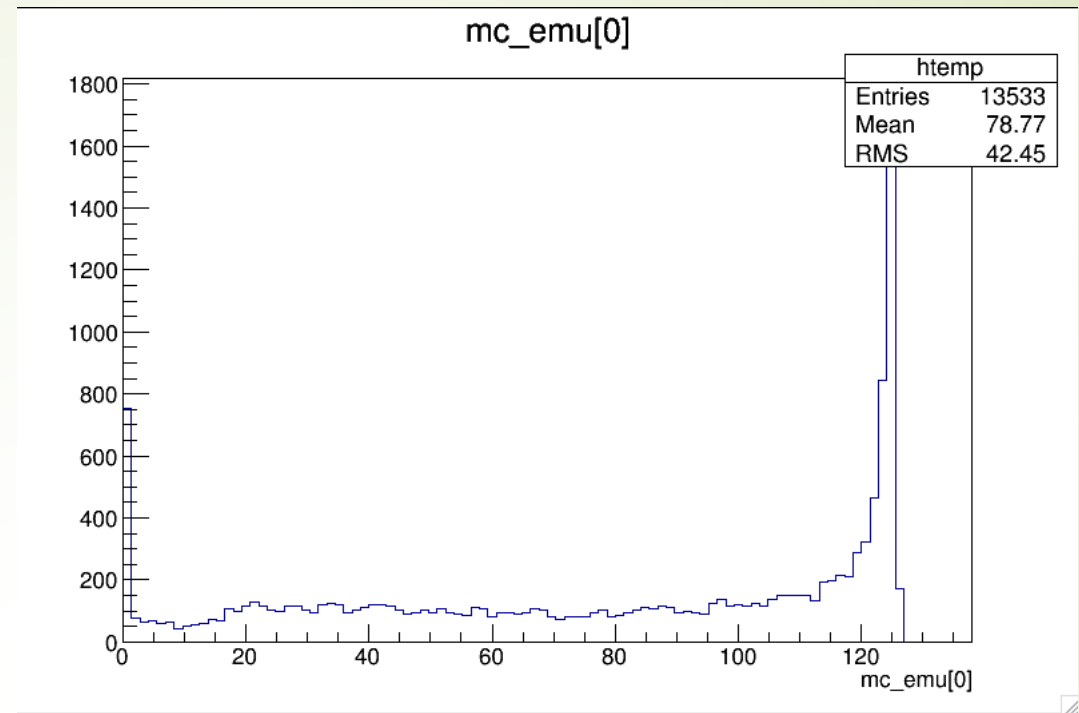
My status : Making Marlin processor for $Z \rightarrow \mu\mu$ process

Energy

➔ MCTParticle

➔ ReconstructedParticle

```
for(int i=0; i<jetcol->getNumberOfElements(); i++) {  
  ReconstructedParticle* part = dynamic_cast<ReconstructedParticle*>(;  
  //      TVector3 v(part->getMomentum());  
  
  double energy = part ->getEnergy();  
  double energymax1 = 0;  
  double energymax2 = 0;  
  
  if(energy > energymax1){  
  
    _data.emu[1] = _data.emu[0];  
    _data.pmu[1][0] = _data.pmu[0][0];  
    _data.pmu[1][1] = _data.pmu[0][1];  
    _data.pmu[1][2] = _data.pmu[0][2];  
    _data.emu[0] = part -> getEnergy();  
    _data.pmu[0][0] = part -> getMomentum()[0];  
    _data.pmu[0][1] = part -> getMomentum()[1];  
    _data.pmu[0][2] = part -> getMomentum()[2];  
  
  }else if(energy > energymax2){  
  
    _data.emu[1] = part -> getEnergy();  
    _data.pmu[1][0] = part -> getMomentum()[0];  
    _data.pmu[1][1] = part -> getMomentum()[1];  
    _data.pmu[1][2] = part -> getMomentum()[2];  
  
  }  
}
```





Tasks

- ▶ Muon selection (by SubdetectorEnergies)
- ▶ Back ground
- ▶ angular distribution of Vector Particle
- ▶ Recovery of Final State Radiation
- ▶ Cross Section \rightarrow Z' mass lower limit



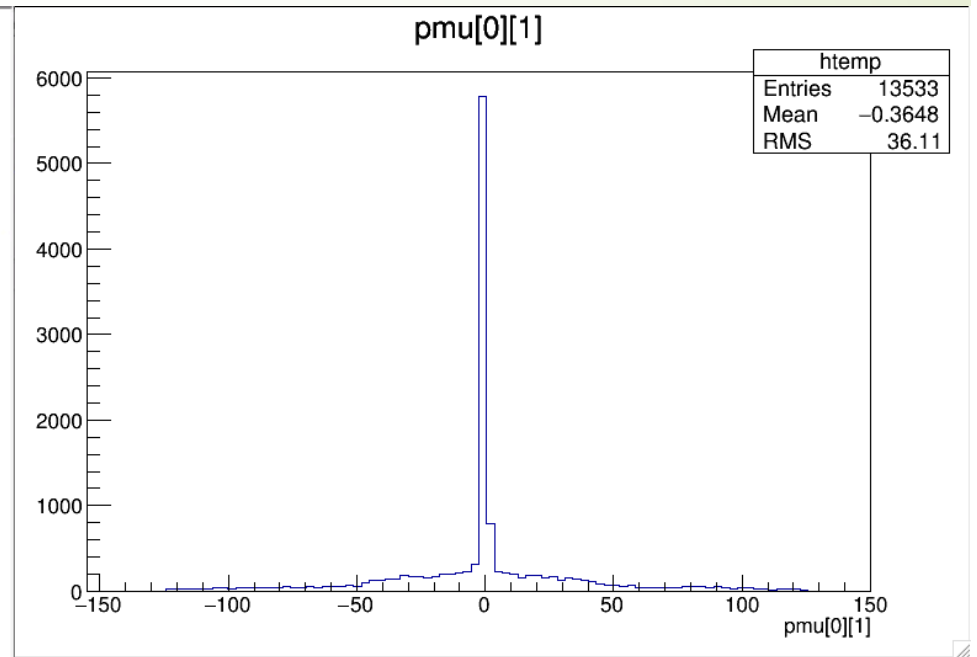
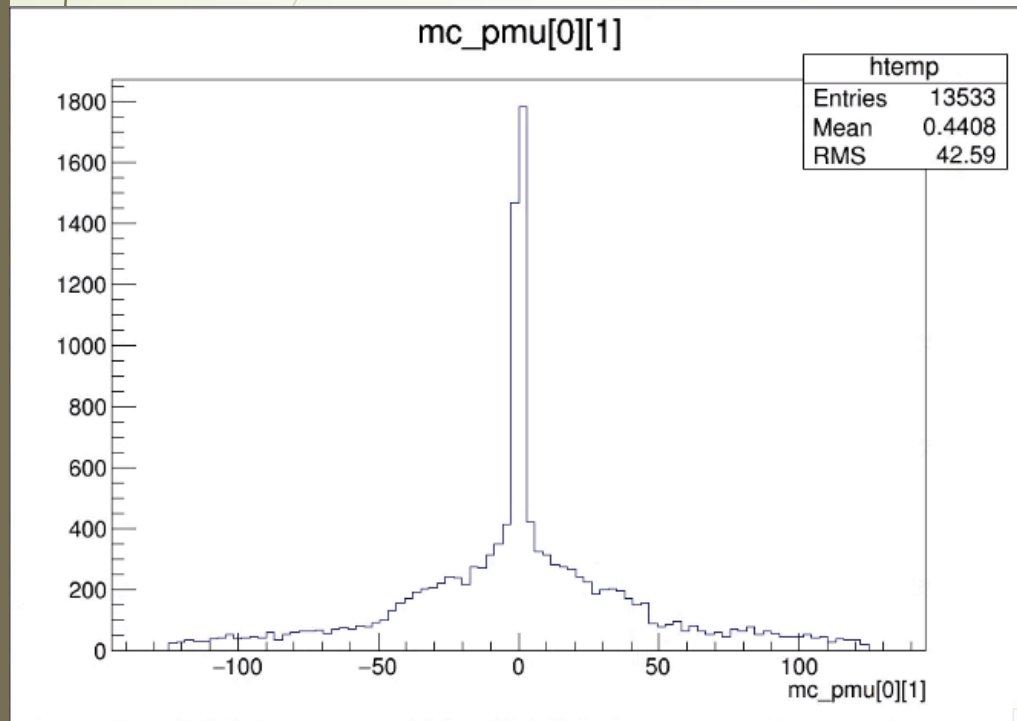
日本物理学会2017 秋季大会

- ▶ Title: 重心系エネルギー250 GeVのILCでのフェルミオンペア生成に関する研究
(Study of fermion pair productions at the ILC with center of mass energy of 250 GeV)
- ▶ Abstract: ILCに於いて電弱相互作用の精密測定は、標準理論を超える物理を探索する。フェルミオン対の生成は、反応断面積や角度分布を調べることにより、 Z^{\prime} のような重いゲージボソンに感度がある。重心系エネルギー500 GeVにおける研究は既に進んでいるが、この講演ではミューオンペアを中心に、重心系エネルギー250 GeVでのフェルミオンペア生成に関する新しいシミュレーションの結果を報告し、今議論中の第一フェーズのILCの可能性を実証していく。

Momentum

➤ MCParticle

➤ ReconstructedParticle



Using 25000 samples (lepton samples)

```
rv01-16-p10_250.sv01-14-01-p00.mILD_o1_v05.E250-TDR_ws.I106606.P2f_z_l.eR.pL-00001-DST.slcio  
rv01-16-p10_250.sv01-14-01-p00.mILD_o1_v05.E250-TDR_ws.I106606.P2f_z_l.eR.pL-00002-DST.slcio  
rv01-16-p10_250.sv01-14-01-p00.mILD_o1_v05.E250-TDR_ws.I106606.P2f_z_l.eR.pL-00003-DST.slcio  
rv01-16-p10_250.sv01-14-01-p00.mILD_o1_v05.E250-TDR_ws.I106606.P2f_z_l.eR.pL-00004-DST.slcio  
rv01-16-p10_250.sv01-14-01-p00.mILD_o1_v05.E250-TDR_ws.I106606.P2f_z_l.eR.pL-00005-DST.slcio
```

- Choose muon process (by PDG)

