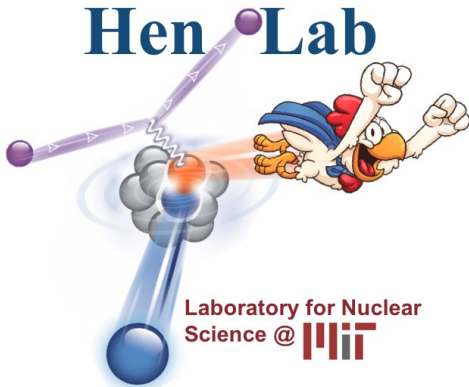
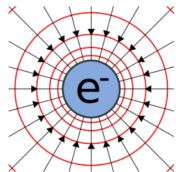


# Electrons for Neutrinos

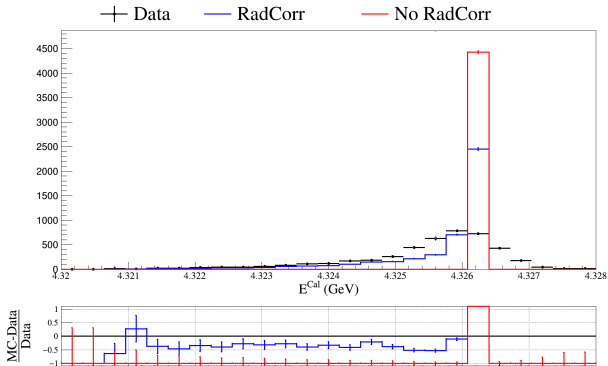


Laboratory for Nuclear  
Science @ MIT

A.Papadopoulou, A.Ashkenazi  
On behalf of the  $e4\nu$  collaboration  
May 15, 2019

# Radiative Corrections

# Without Smearing



Introduction of smearing is necessary to account for our detector resolution

# Smearing In Simulation

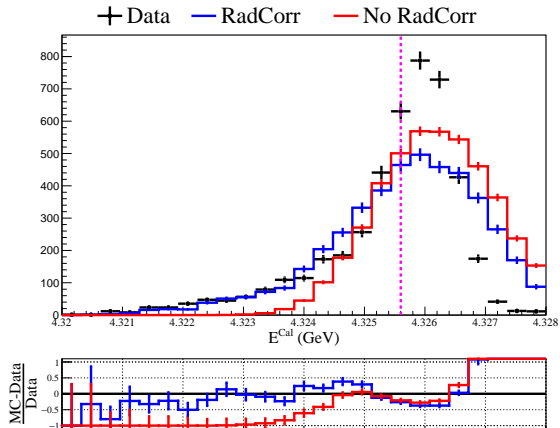
On both e/p in simulation

- $\delta P / P = 0.0265\%$
- $\delta\theta = 0.85$  mrad
- $\delta\phi = 4$  mrad

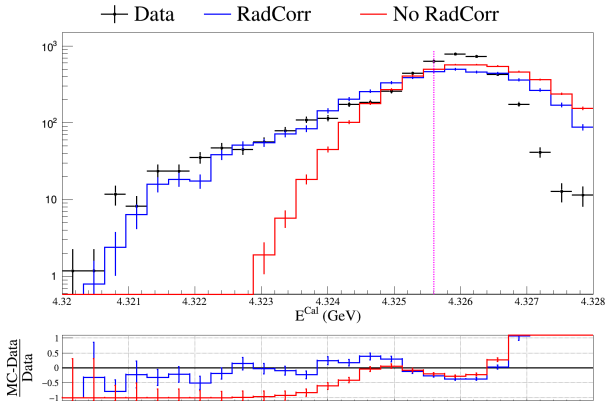
# Acceptance Maps

- 2x4D acceptance maps for  $(e', p)$
- 4D in terms of  $(\delta, y_{\text{ptar}}, x_{\text{ptar}}, Z \text{ vertex})$
- Divide weight in data by acceptance weights

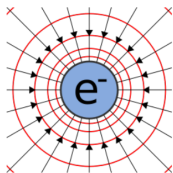
# Calorimetric Energy



# Calorimetric Energy



Same as previous slide with log scale



Thank you!





# Backup Slides

# Cuts

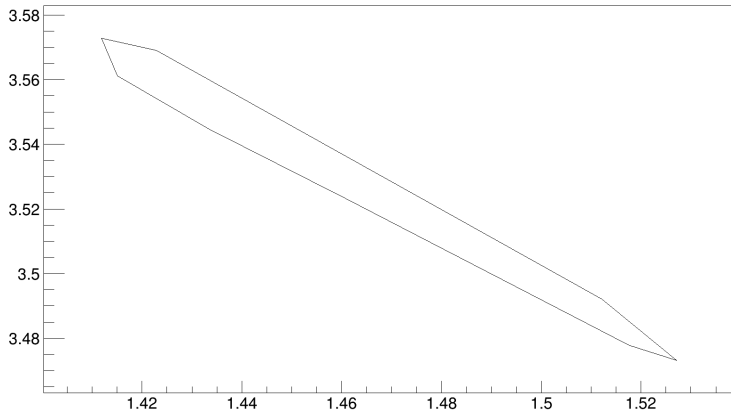
```
double Lcoll = pow((L_ytar[file]+1.15*L_yptar[file])/0.08,2)+pow(1.15*L_xptar[file]/0.08,2);
double Rcoll = pow((R_ytar[file]+1.15*R_yptar[file])/0.08,2)+pow(1.15*R_xptar[file]/0.08,2);
double del_z = TMath::Abs(L_vz[file]-R_vz[file]);

(Lcoll < 1)&&
(Rcoll < 1)&&
(TMath::Abs(L_dp[file]) < 0.045)&&
(TMath::Abs(R_dp[file]) < 0.045)&&
(del_z<0.02)&&
(TotalMissMonValue<0.04)
```

& away from the edges of the vessel

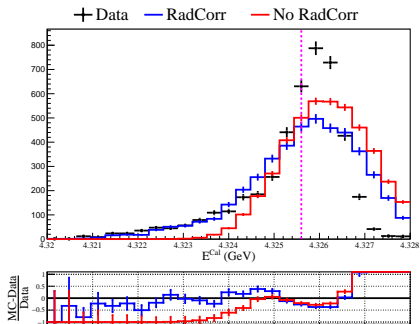
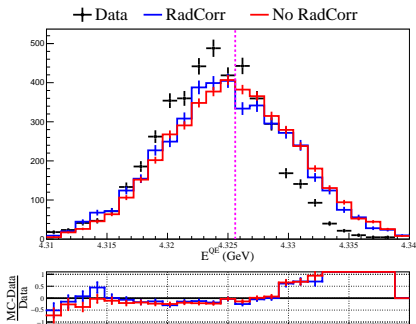
# Cuts

$P_{e'}$  (GeV/c)



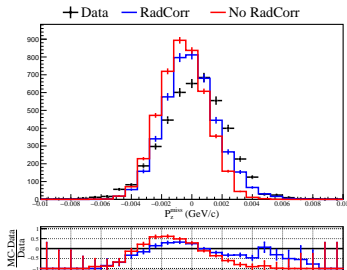
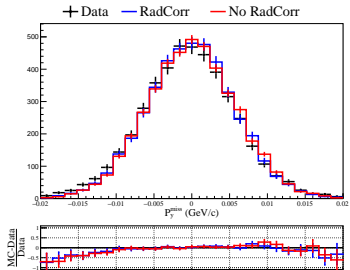
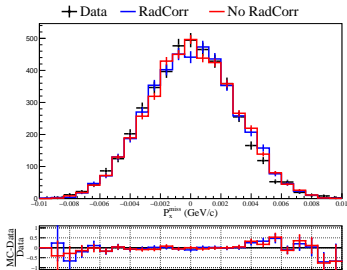
$P_p$  (GeV/c)

# Reconstructed Energy

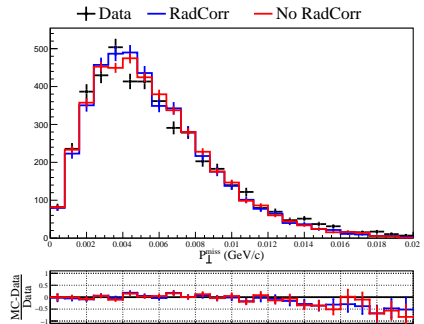
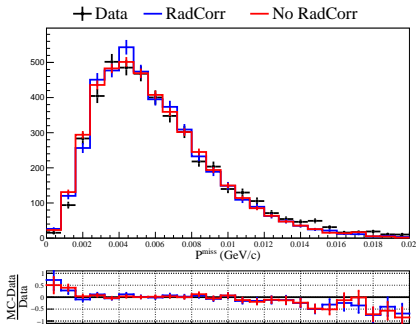


$E = 4.3256 \text{ GeV}$

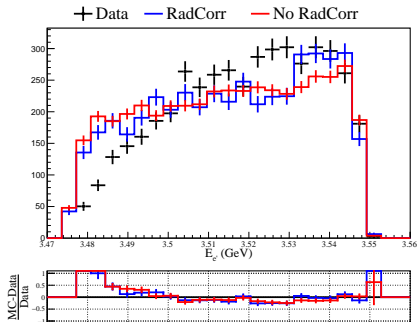
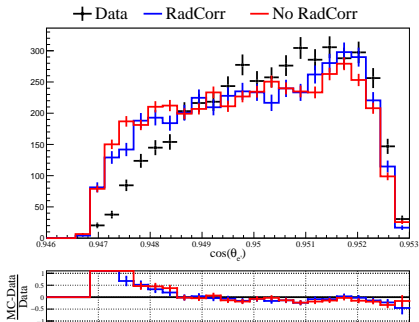
# Missing Momenta



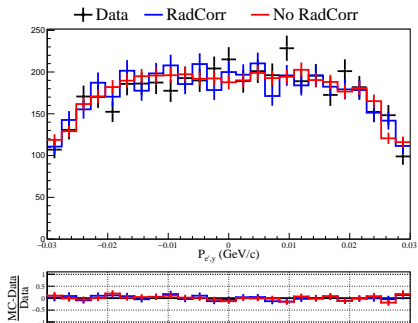
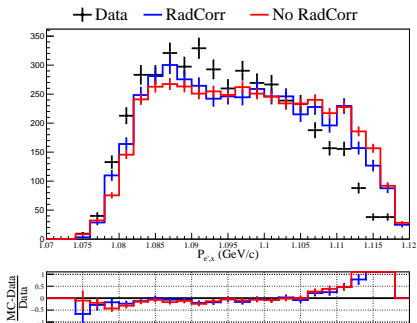
# Missing Momenta



# Electron

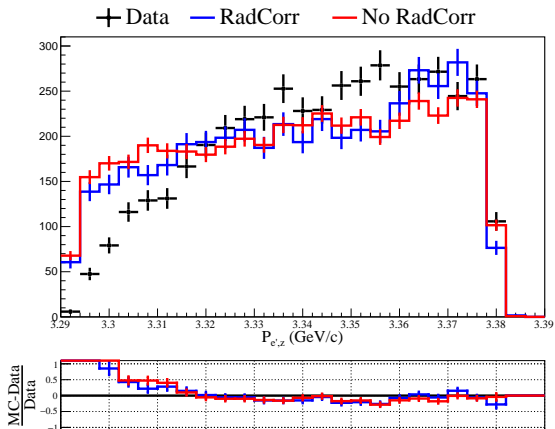


# Electron

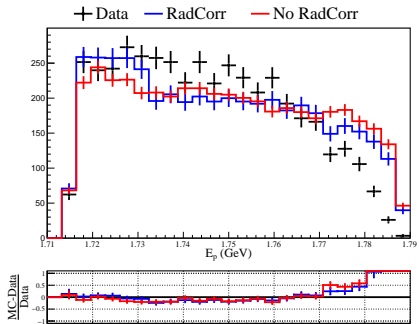
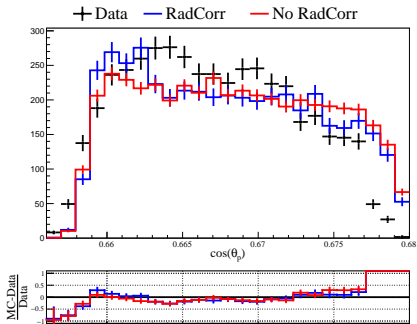




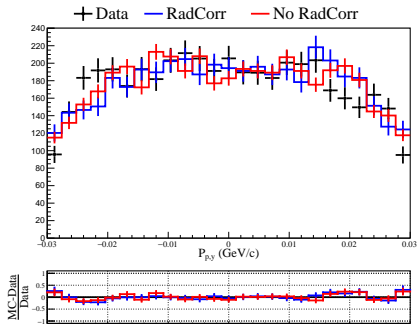
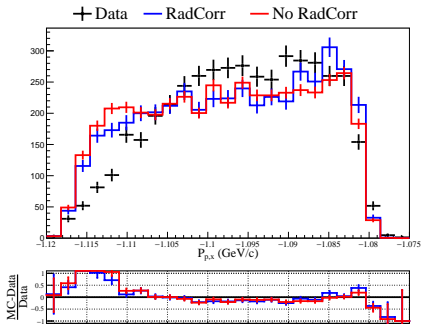
# Electron



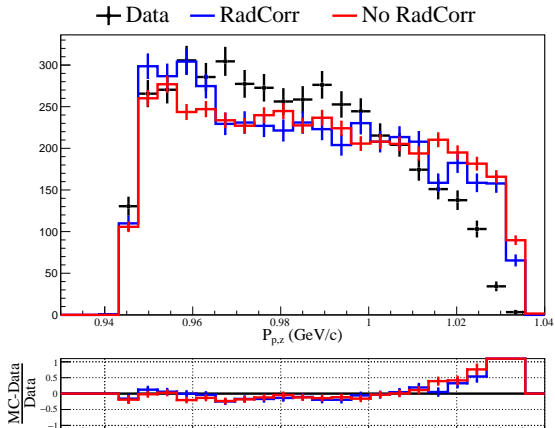
# Proton



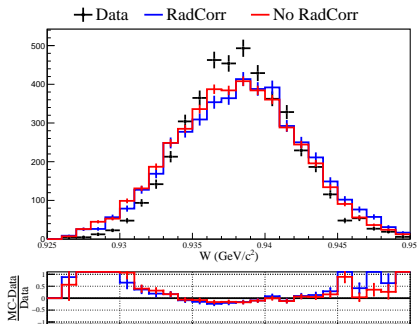
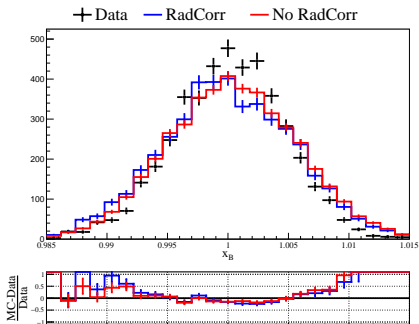
# Proton



# Proton



# Reconstructed Q



# Reconstructed Q

