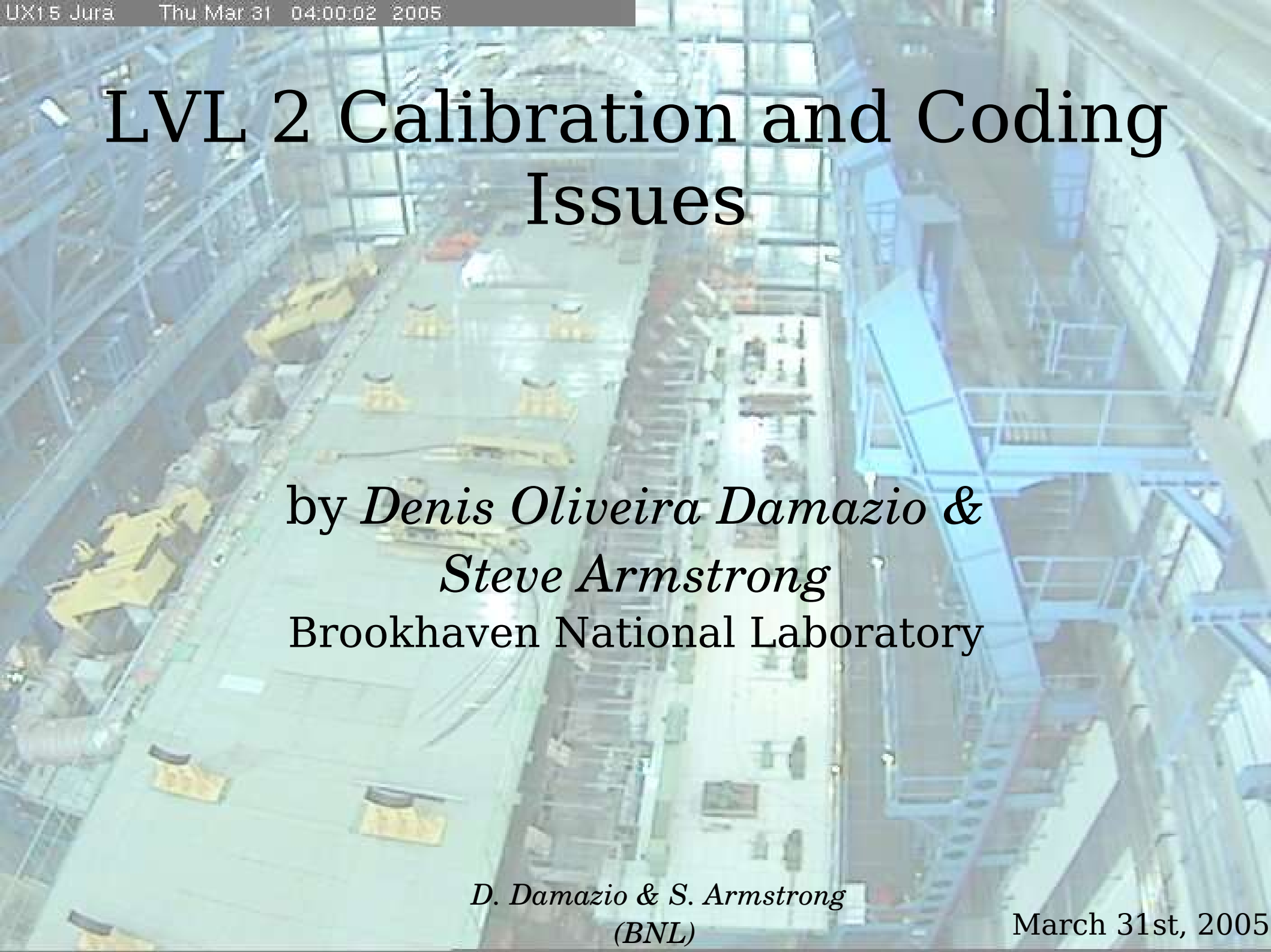


LVL 2 Calibration and Coding Issues

by *Denis Oliveira Damazio & Steve Armstrong*
Brookhaven National Laboratory

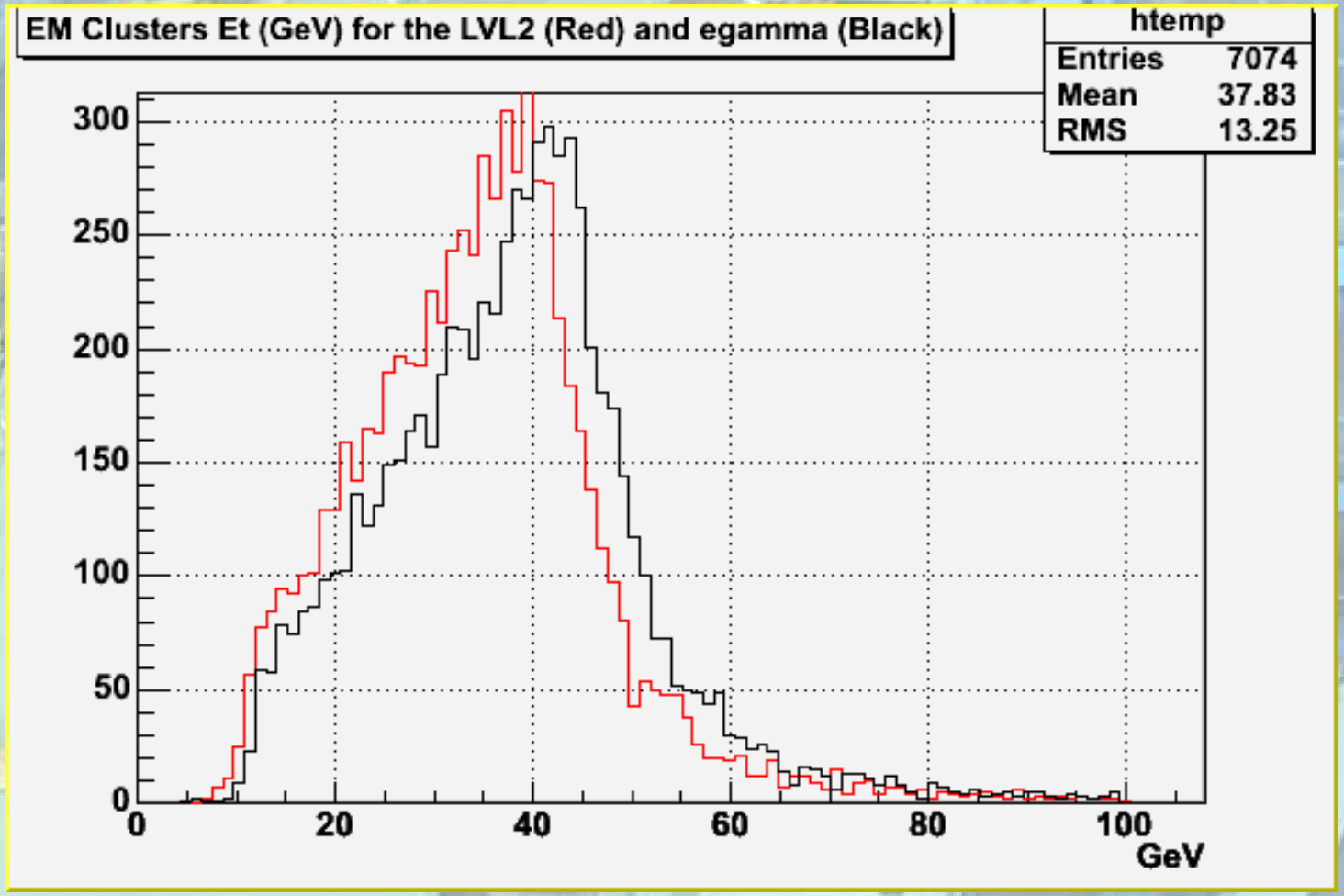
Introduction

- As shown in the last Calorimeter Trigger performance meeting, there is a clear need for calibration at the LVL2.
- We need to import calibration constants from the offline code.
- Code development must consider processing time. However, one could try to reuse some code.

Methodology

- DC2 sample (Z->ee). Run 003007. Check electrons Pt and Z0 Mass comparing with egamma. Offline 10.0.1. Digitized with 10.0.0.
- Eta/Phi matching beforehand.
- Scott Snyder cluster confinement constants.
- Scott's Gap correction being applied, but the LVL2 does not consider TileGap3, only partial effect.
- RegionSelector Map must be created for that.

No calibration. Electrons Pt.



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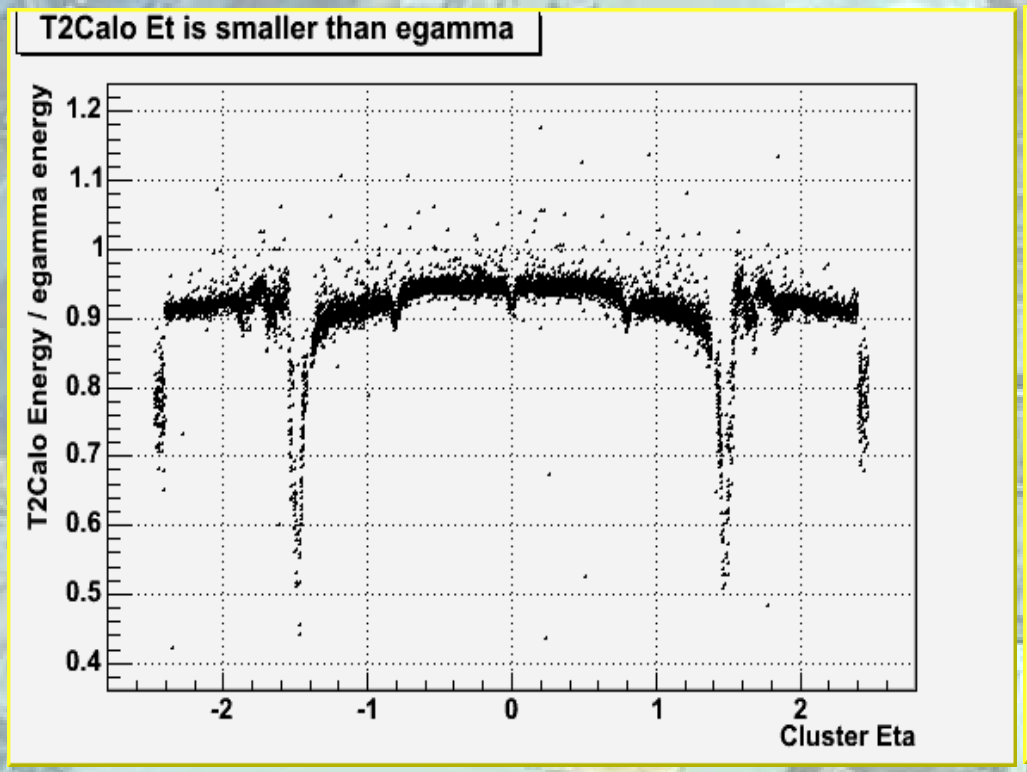
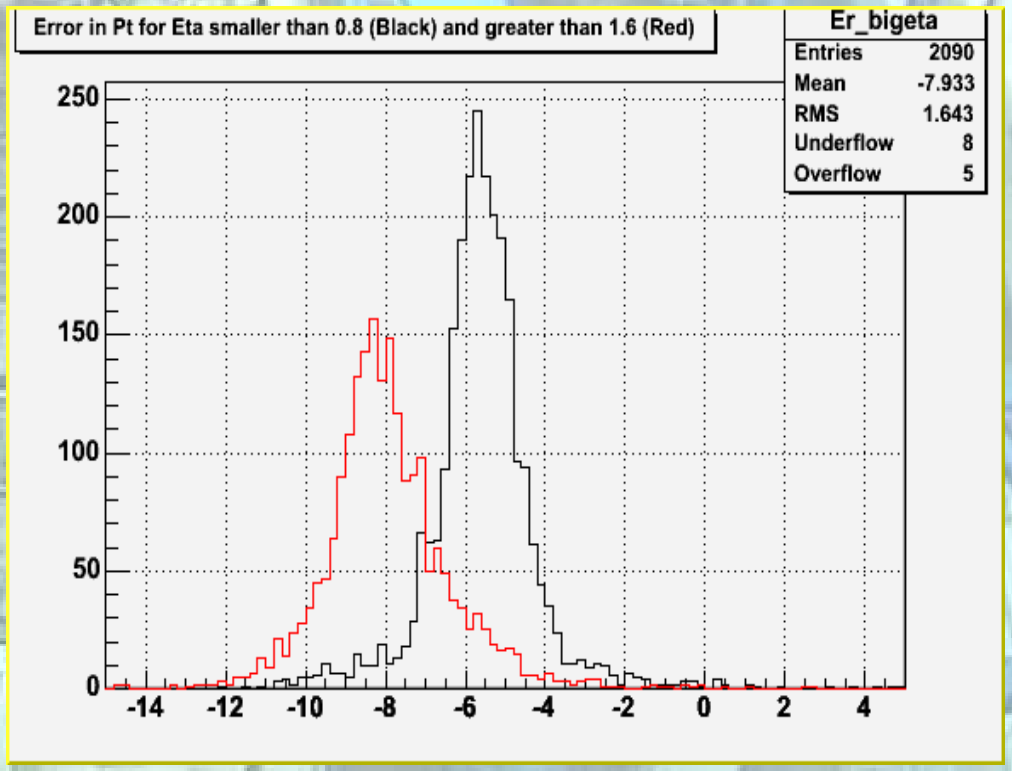
Comparison offline/LVL2 with no Calibration.

Energy comparison for each eta bin



difference in recovery performance for barel/ext



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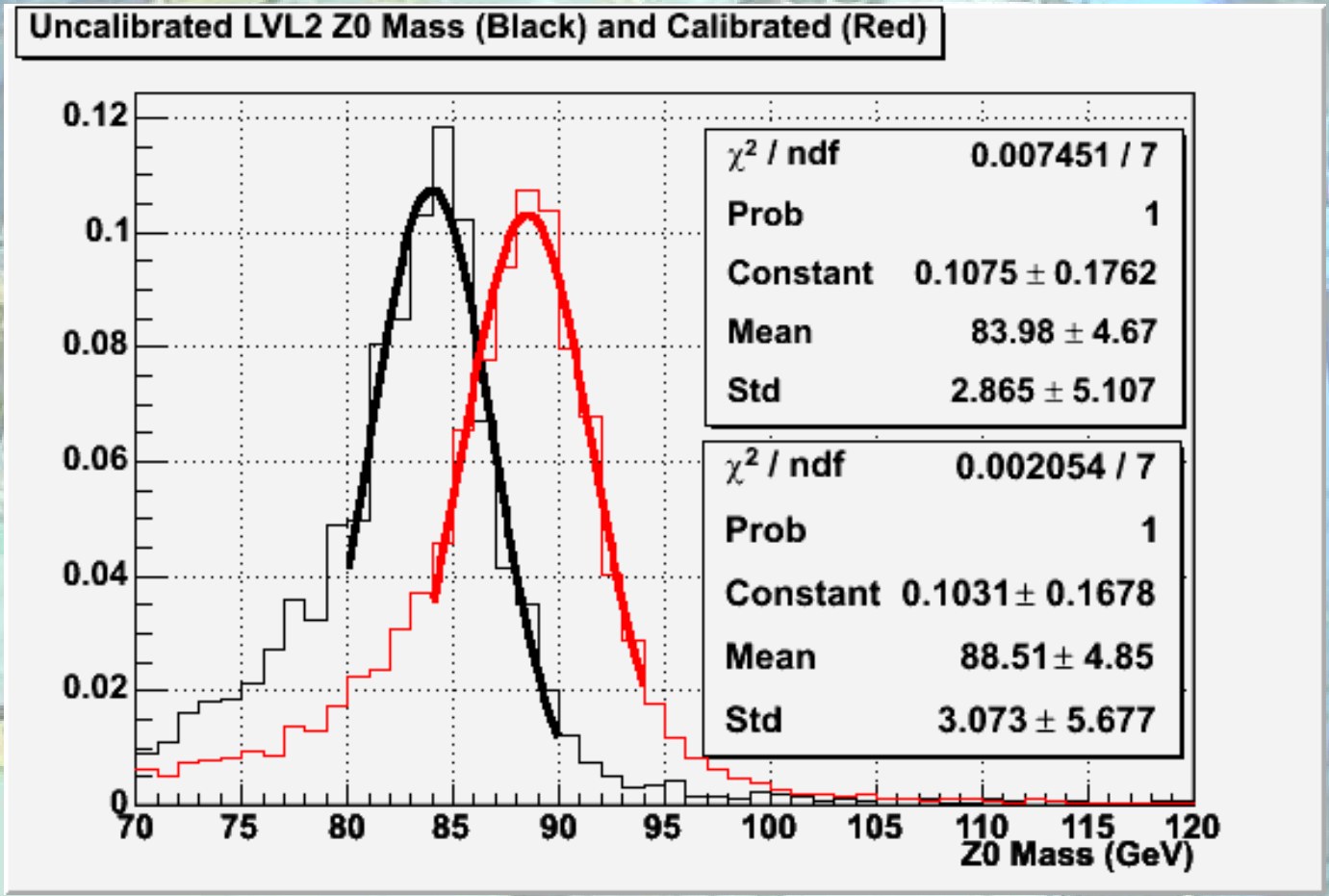
Calibration performed. Z0 Mass recovery.

Please, note the mean shift and the std



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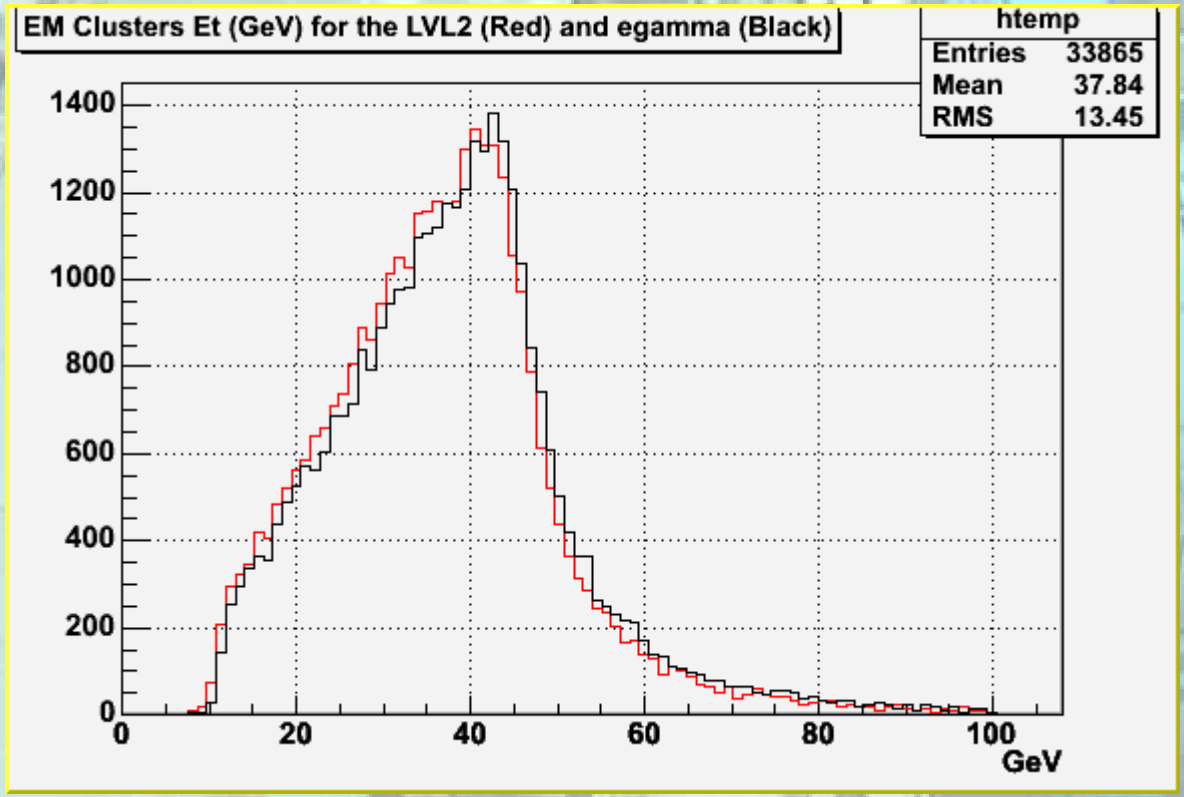
Calibration Performance. Electrons Pt recovery.



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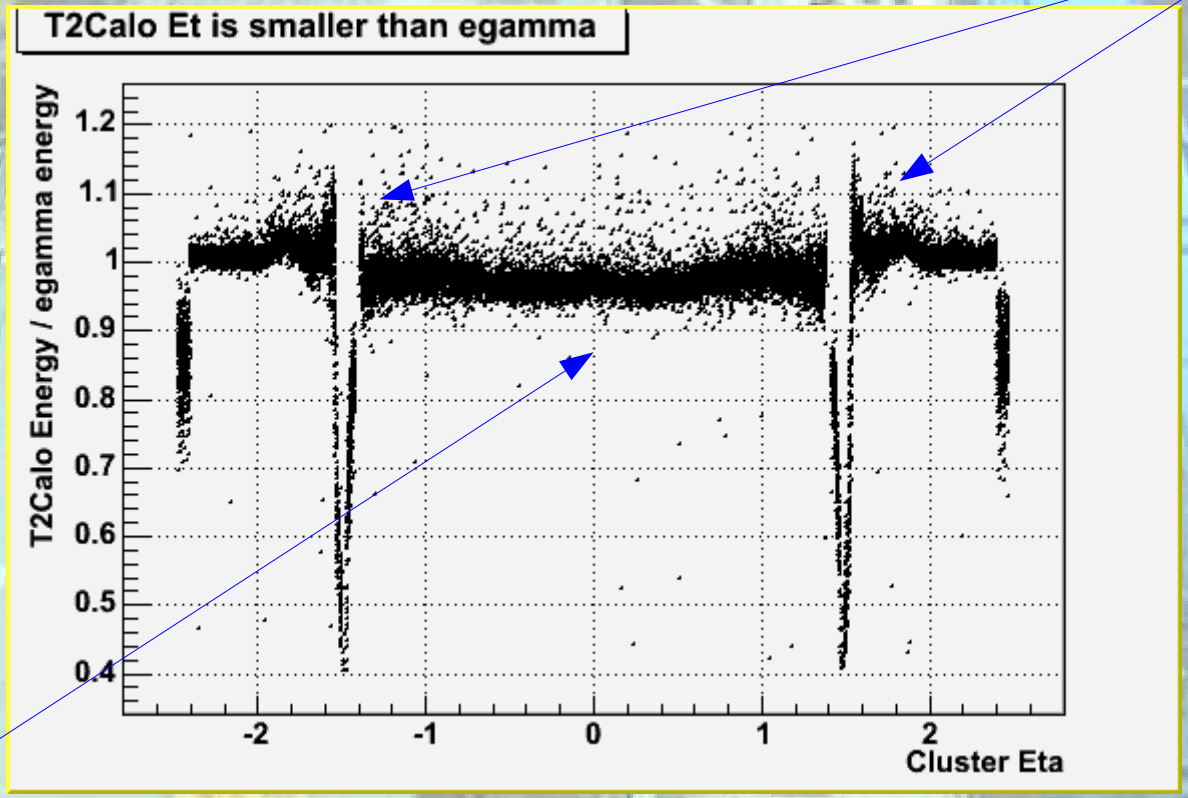
Calibration performed. Electrons Pt recover per Eta.

Gaps not recovered



barrel has smaller recover

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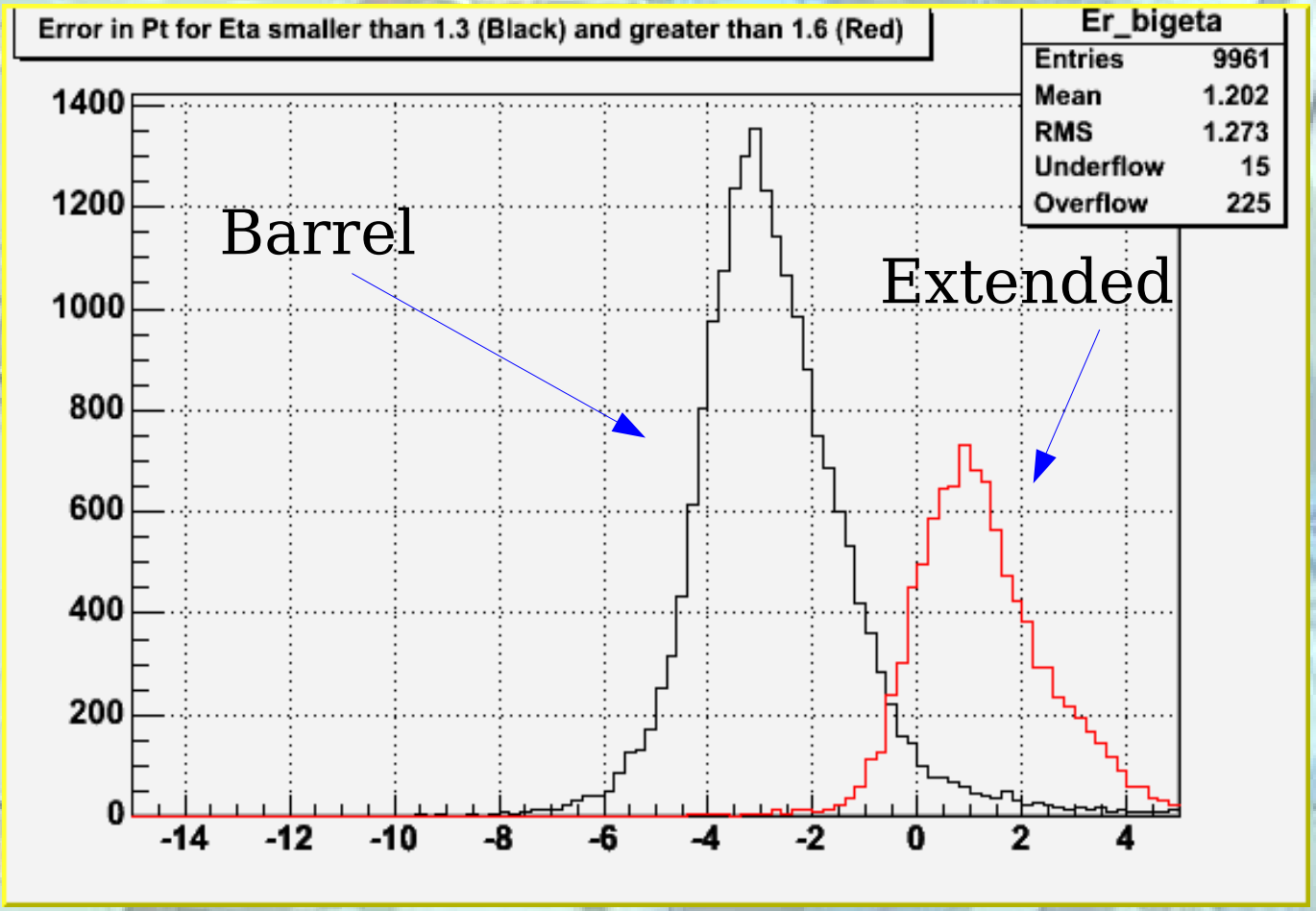
Comparing barel/extensions.

- The reverse of what happened without calibration.
- The Presampler is missing.
- With the presampler, longitudinal weights could be applied



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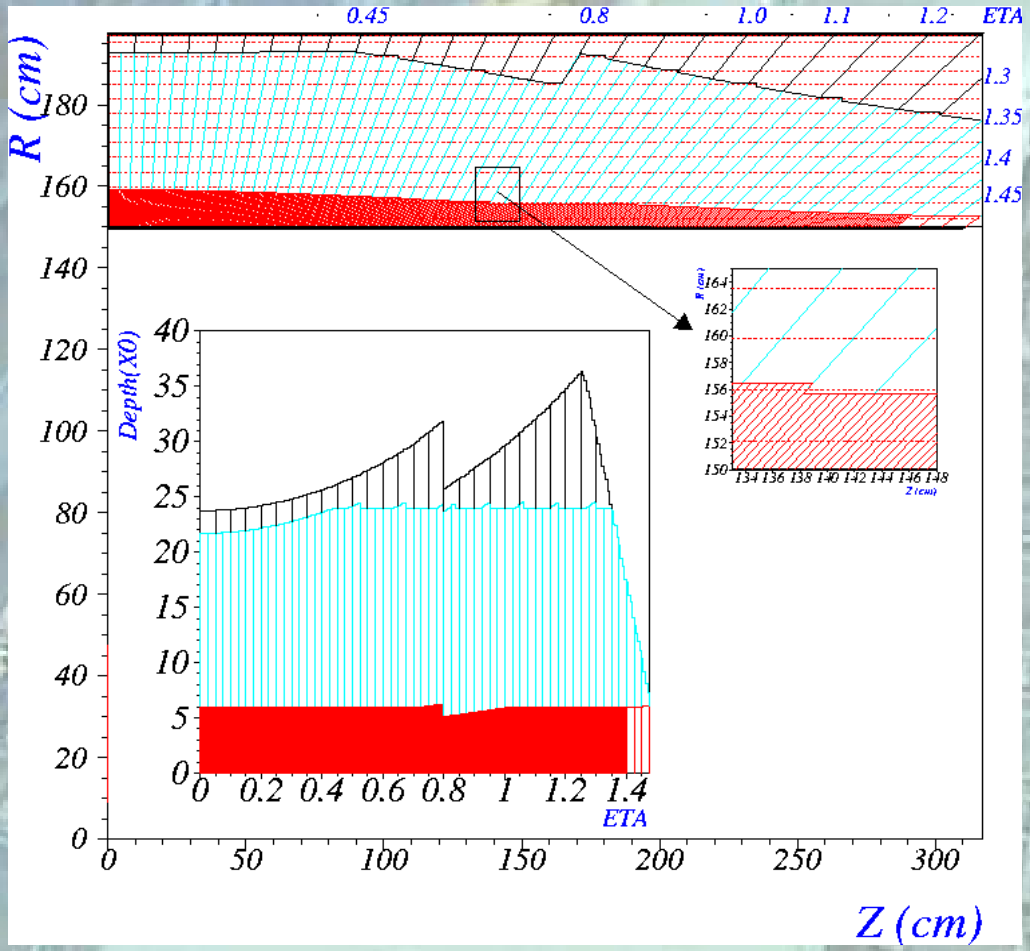
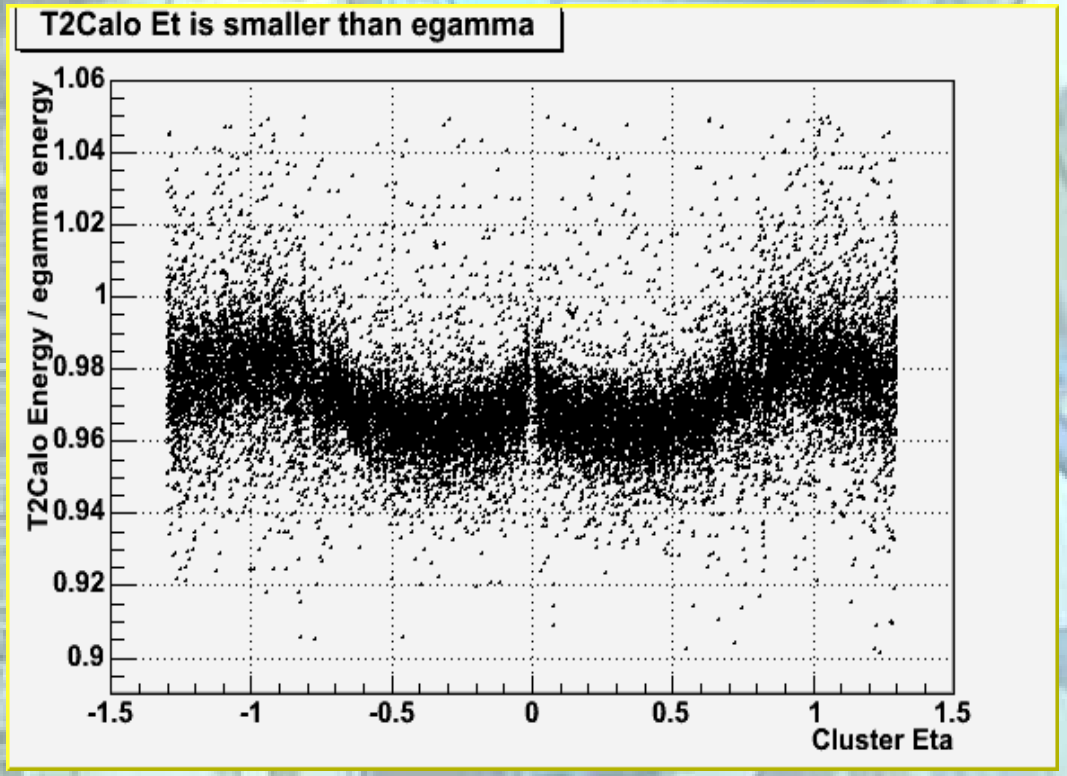
Specialy at the barel.

TDR picture





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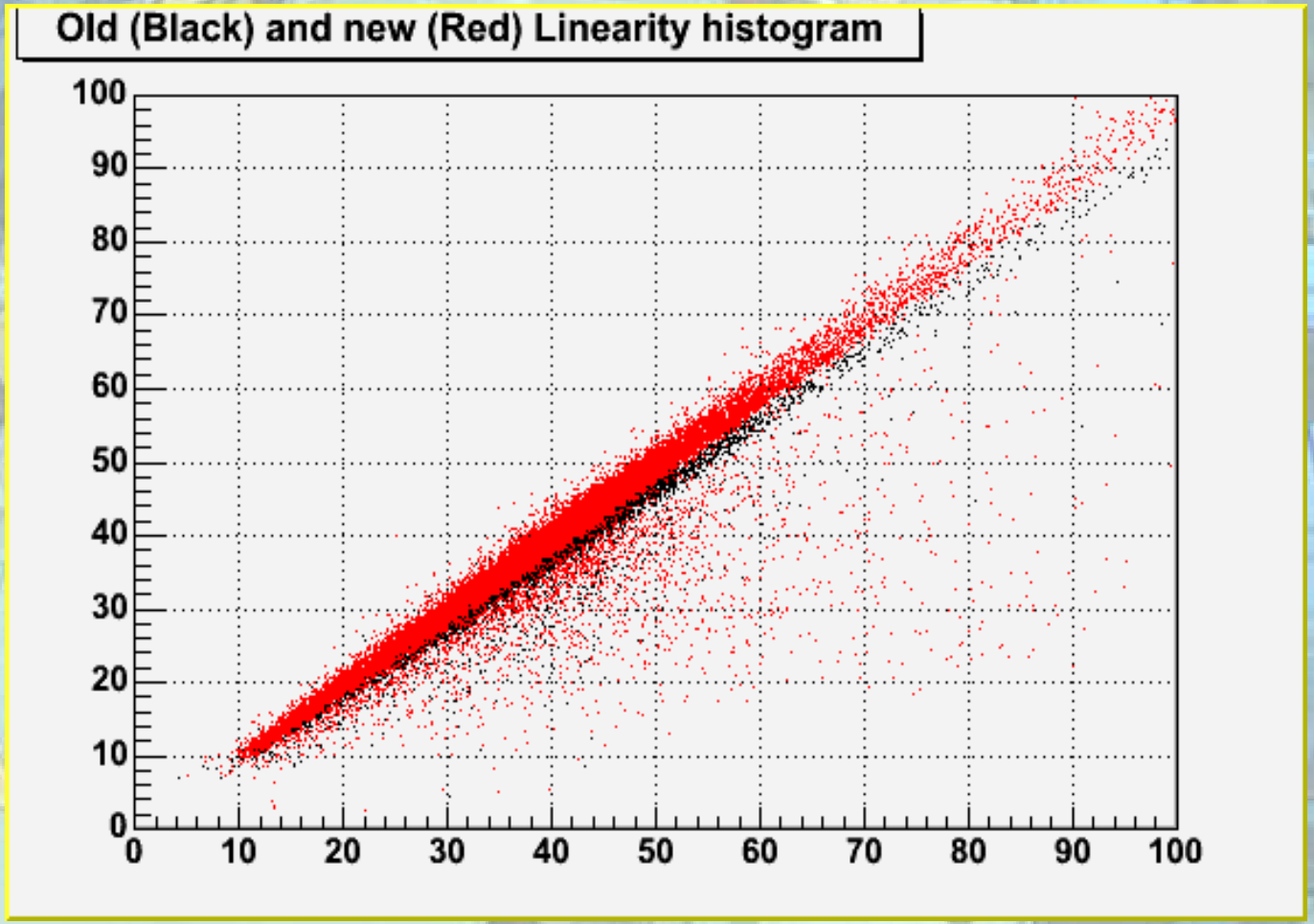
Linearity LVL2/offline.

Before and after the correction



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Coding Issues

- Missing the RegionSelector Map to access the TileGap3. Should we have another « CaloTileGap3.h » ?!
- Need to add a CaloSamp0.h (PreSampler).
- Different calibration constants for each Samp (Longitudinal Weights). Calib Tool?!
- Code improved, correction per cluster, not per cell (Stupiedly done before).
- The present code to be checked in. Newest constants used.

Coding Issues

- The Calo*.h and the Calo*.cxx.
- Is that possible to use inheritance to avoid code replication.
- Of course, time performance must be considered.

xdiff

```
// ***********************************************************
//
// NAME:     CaloSamp1Fex.h
// PACKAGE:  Trigger/TrigAlgorithms/TrigT2Calo
//
// AUTHOR:   M.P. Casado
//
// REFERENCES: Based on Trigger/TrigT2Calo/T2EmEcalAlgorithm
//
// - Add T2Calo to execute function to allow access to T2Cal
//   variables for job option controlled region limits   - R
// ***********************************************************

#ifndef TRIGT2CALO_CALOSAMP1FEX_H
#define TRIGT2CALO_CALOSAMP1FEX_H

#include "CaloIdentifier/CaloIdManager.h"
#include "StoreGate/DataHandle.h"

#include "TrigT2Calo/IAlgToolCalo.h"
#include "GaudiKernel/AlgTool.h"
#include "TrigTimeAlgs/TrigTimerSvc.h"

class ITrigRegionSelector;
class StoreGateSvc;
class LArRoI_Map;                                   // SH
class IROBDataProviderSvc;
class T2CaloBase;

class CaloSamp1Fex: public IAlgToolCalo, public AlgTool {
  public:
    CaloSamp1Fex(const std::string & type, const std::string
                 const IInterface* parent);
    virtual ~CaloSamp1Fex();
    StatusCode initialize();
    StatusCode finalize();
    StatusCode execute(EMShowerMinimal &pEMShowerMin,double
                       double phimin, double phimax, T2CaloB
  private:

    std::string  m_regionSelectorTool;

    StoreGateSvc*                m_storeGate;
    ITrigRegionSelector*         m_pRegionSelector;     // R
    const LArRoI_Map*            m_roiMap;              // S
    IROBDataProviderSvc*         m_robDataProvider;
```

```
// ***********************************************************
//
// NAME:     CaloEmEnFex.h
// PACKAGE:  Trigger/TrigAlgorithms/TrigT2Calo
//
// AUTHOR:   M.P. Casado
//
// REFERENCES: Based on Trigger/TrigT2Calo/T2EmEcalAlgorithm
//
// - Add T2Calo to execute function to allow access to T2Cal
//   variables for job option controlled region limits   - R
// ***********************************************************

#ifndef TRIGT2CALO_CALOEMENFEX_H
#define TRIGT2CALO_CALOEMENFEX_H

#include "CaloIdentifier/CaloIdManager.h"
#include "StoreGate/DataHandle.h"

#include "TrigT2Calo/IAlgToolCalo.h"
#include "GaudiKernel/AlgTool.h"
#include "TrigTimeAlgs/TrigTimerSvc.h"

class ITrigRegionSelector;
class StoreGateSvc;
class LArRoI_Map;                                   // SH
class IROBDataProviderSvc;
class T2CaloBase;

class CaloEmEnFex: public IAlgToolCalo, public AlgTool {
  public:
    CaloEmEnFex(const std::string & type, const std::string
                const IInterface* parent);
    virtual ~CaloEmEnFex();
    StatusCode initialize();
    StatusCode finalize();
    StatusCode execute(EMShowerMinimal &pEMShowerMin,double
                       double phimin, double phimax, T2CaloB
  private:

    std::string  m_regionSelectorTool;

    StoreGateSvc*                m_storeGate;
    ITrigRegionSelector*         m_pRegionSelector;     // R
    const LArRoI_Map*            m_roiMap;              // S
    IROBDataProviderSvc*         m_robDataProvider;
```

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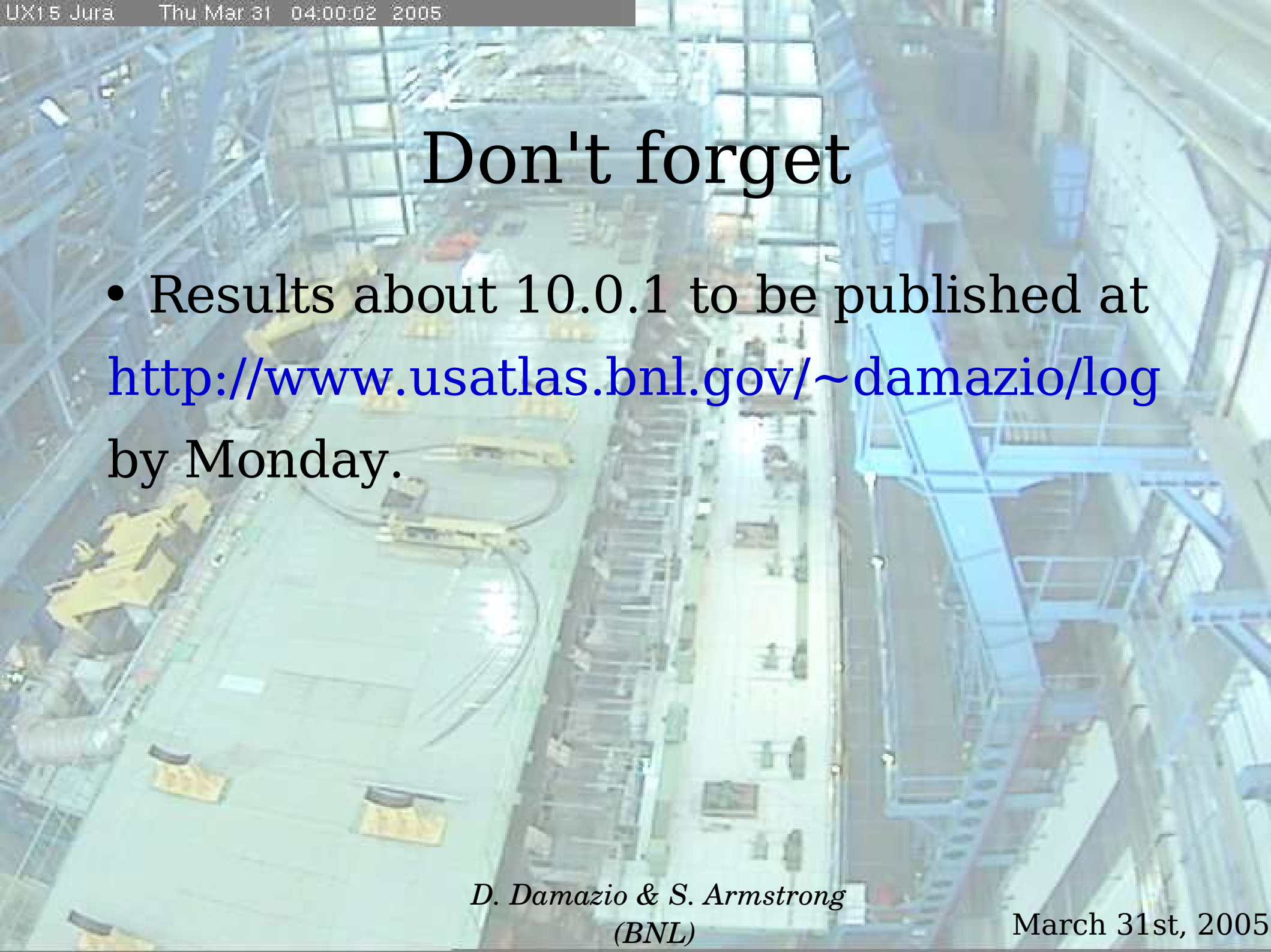
UX15 Jura Thu Mar 31 04:00:02 2005

Conclusions

- An effort to start a calibration at the Level 2 has been started.
- Changes to be commited Today or Tomorrow to TrigT2Calo.
- Weights defined in jobOptions.
- More inclusive calibration (Real gap correction and Longitudinal weights – from Paganis) to be developed.

Next Steps

- Need to have Region Selector prepared for that (Gap). Working on that with Aline Gesualdi Mello.
- Need to work with the PreSampler. We will be doing that.
- Need to think about reorganizing the code. Too many similar lines.
- Need to measure overall performance and check the impact of calibration.



Don't forget

- Results about 10.0.1 to be published at http://www.usatlas.bnl.gov/~damazio/log by Monday.