^{55}Fe Cluster Energy Analysis

Lucas Coelho

Rafael Nóbrega, Igor Pains and Igor Abritta

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Outline

- Introduction
- Cluster centering
- Energy and radius analysis
- Reconstruction algorithm deviation
- Conclusions

Introduction

Objectives

- Measure iron energy profile from the center to the border
  - Radius value to get ~100% of spot energy?
- Evaluate reconstruction algorithm performance
  - How much of the iron energy is it measuring?
- Study impact of threshold and DBSCAN parameters

Cluster centering

The spot center has been measured using the mean of the coordinates values of the pixels with energy greater than a threshold.

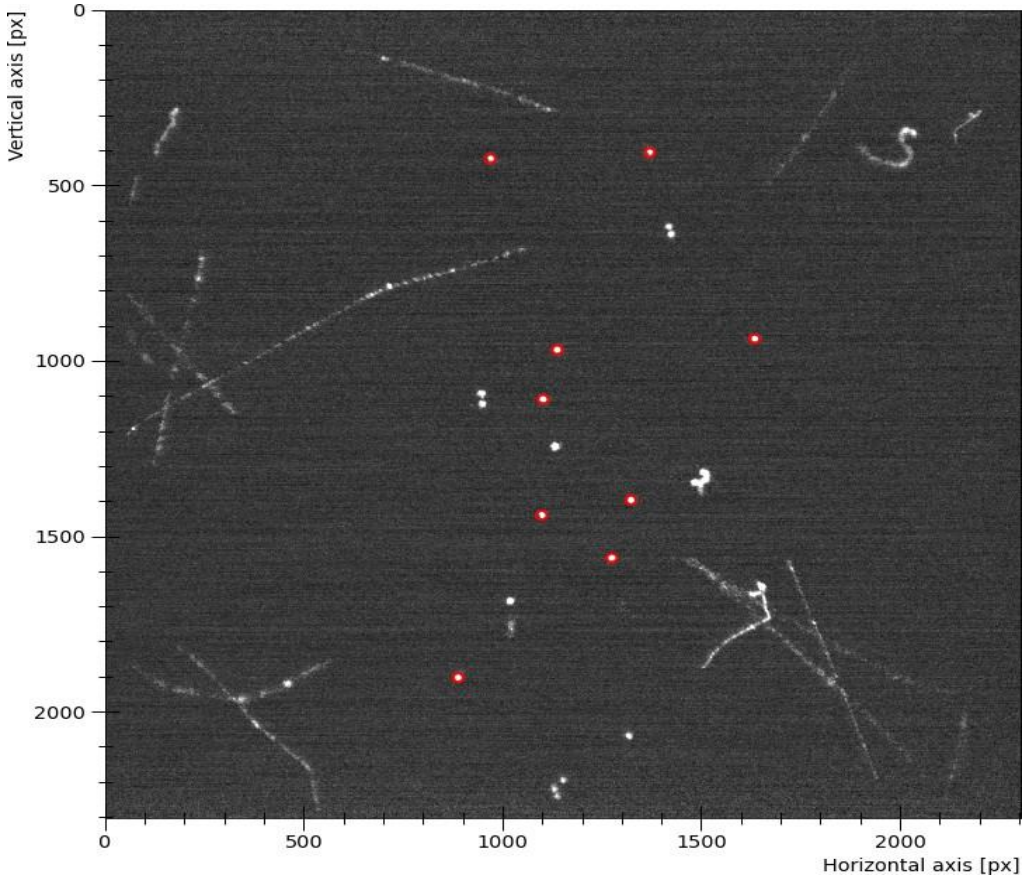

Figure: Event 32 - Run 5890

Energy and radius analysis

The plateau is generally achieved above radius 10 and below radius 20.

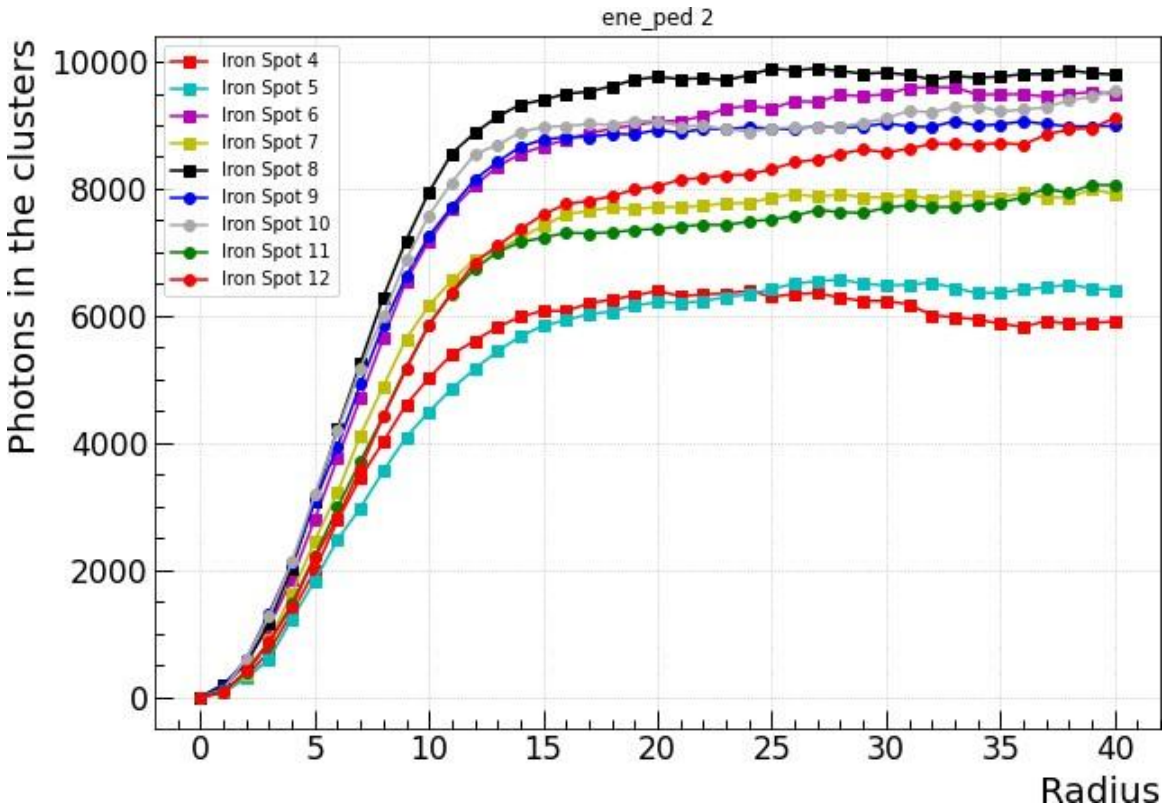

Figure: Event 32: cluster energy versus radius

Energy and radius analysis

A S-curve fitting is used to estimate the cluster energy evolution.

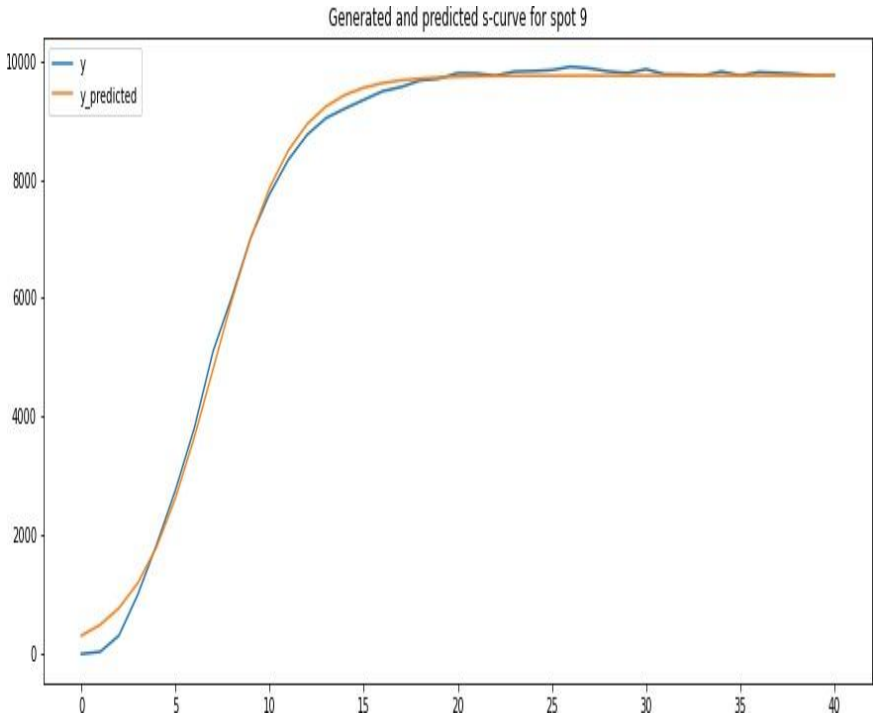

Figure: S-curve fitting

Radius for 90% of the iron spot energy.

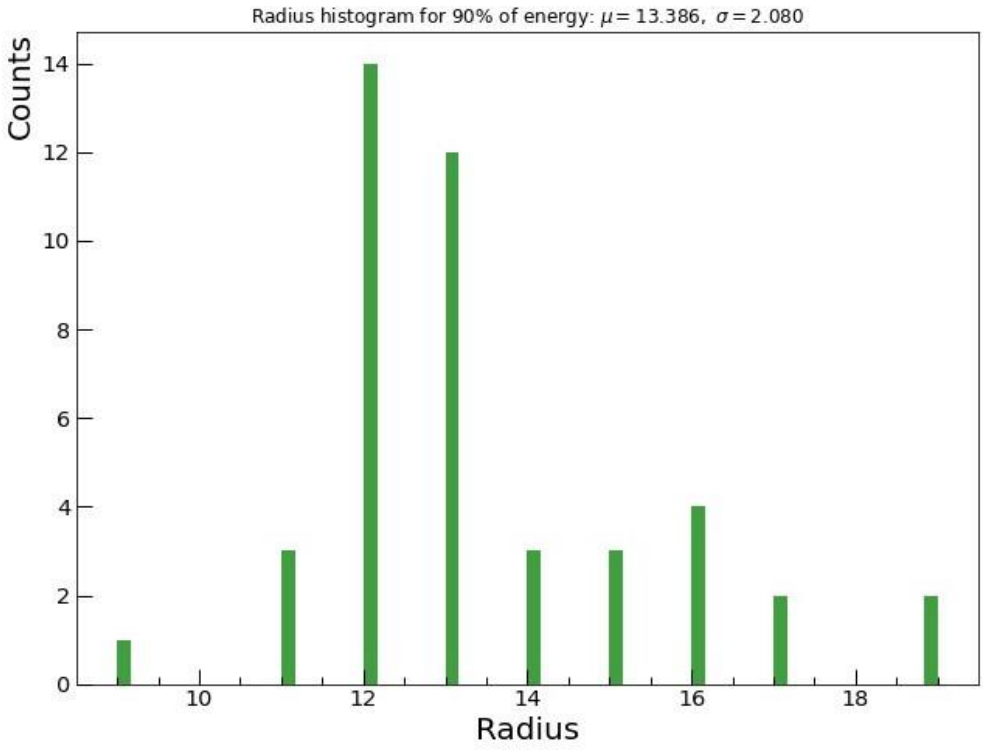

Figure: Radius histogram for 90% cluster energy with maximum estimated by s-curve fitting

Reconstruction algorithm deviation

400 images were used to measure the deviation between the energy estimated with this analysis (radius = 20) and the energy computed by the reconstruction algorithm.

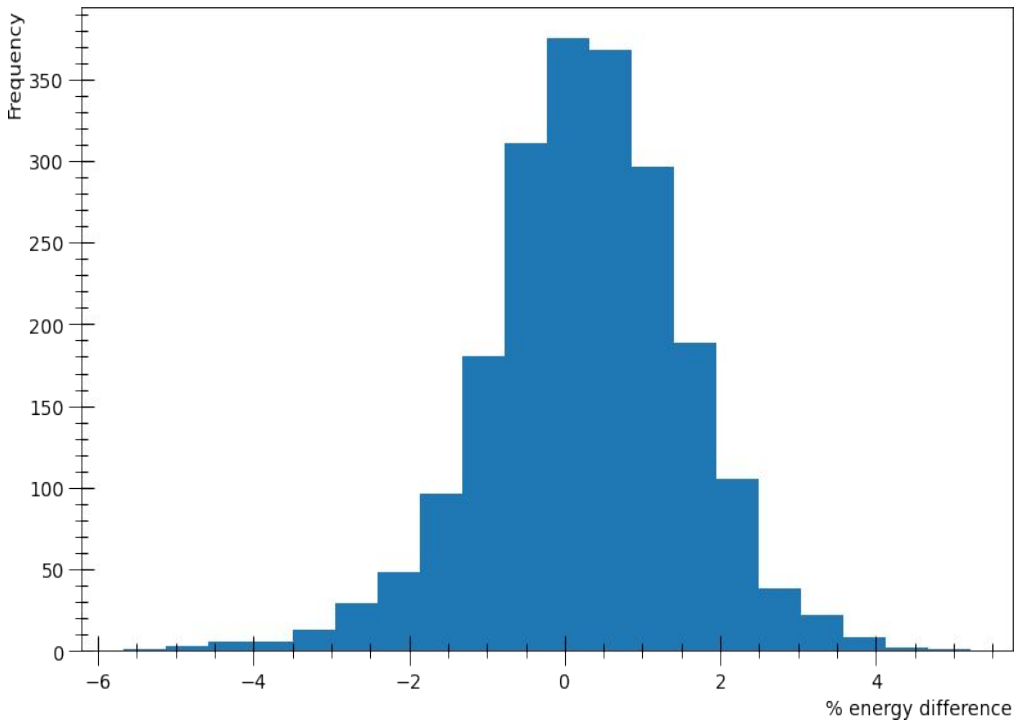

Figure: Percentage of reconstruction energy deviation to cluster analysis with radius equal 20

Preliminary Conclusions and next steps

Conclusions

- 90% of the iron energy falls between 10 and 20 (radius)
- The reconstruction algorithm seems to be measuring the ^{55}Fe cluster energy with no bias and small deviation

Next steps

- Evaluate impact of threshold and DBSCAN parameters