Projects for summer 2018

People: Sam, Jim, Kirsten, Joe@lanl , Tomas, Alison; Brendan, Shivang Patel, Pranav (remote), Cameron.

Summary:	Away:
Jim: unfolding note, Hi E paper; restart meetings	May 17-Jun-8; Jun 15-21; July 14-21
Kirsten: LANL visit; what will we stop doing	May 14-18, June 18-25, Jun27-Jul 11
Sam: hi E paper, LIV limit	
Joe: LANL, DM all sky, homer/OR rate from Athena	May3-Sep 1
Alison: pbh, LANL visit, homer/OR graphic rates	May 19-26, June 18-30
Tomas: g/h, unfold	depart July 31
Pranav: homer/OR rate table?	Remote
Brendan: g/h; Jesse variables	May2-8; xxx
Cameron: novae	
Shivang (“Chevy”): mu finder	July 17-Aug9

Who?
g/h to Kyle Cranmer, Jesse, CP variables to Brendan
Shifts? Alisson?

Computers, screens, seats for all Shivang: Joe’s desk

Goals for Collab Meeting June 4-8

Reading: start with thin cosmic rain; Root tutorial for Elie and Joe; lectures?
Read Cosmic Perspective; HAWC public website
Other books?

not this summer:
MSU Event Display work
- Real data path
- Into atrium?

NKG speedup?
Electronics to MC
Tevcat dN/dS, extrapolate to # new sources (galactic, extragalactic) [no]
Sensitivity in flux 3 sigma 5 sigma vs dec for a given pass

Tomas:

Make a map for all bins, and one map per fbin (using the Net with 7 input)

Comparison of MC and data (using the weight with declination 22º)

Unfolding

Check the works of the PSU and UNM guys (on low E)

Test with other features as input

Add new hadron rejection variable based on Muon identification.

Use BDT

Training with data

Added: clarify if MC IS/WAS misleading us in fact…?

** Try train with bkg MC and compare w/ bkg data?

Look at older fits from MC bkg and see if actually worse on crab strip?

Brendan:

Look at crab strip to see if improvements have been made.

Use Softer version of pinc and compactness cuts first then new method cutting ~95% background

Use softer version of new method cutting ~50 to 75% of background then using hard version

Check both methods by making significance maps and looking at the significance of the crab

2. Run same analysis but include Jesse's variables
3. Look into non-linear/fancier dimension reduction methods

Shivang: Mu finder

Add to HAWC (Jim: today) foswiki; umd; what else?

Get all the permissions (mentor: Tomas)

Where to work from Joe's desk

Aerie tutorial

HAWC installation to work from umd

Get him Ty's slides

Hadron rejection:

MC—all variables; same on Crab; [then go public]

Try with a few clusters (presently based on 1 cluster from 100 leaves);

apply CP's profile variable;

fit pdfs?

<r^n> for profile? Parameterize? Chisq?

Jesse: how do C1, C2, D2, tau's work for HEP 1,2,3 lumps

Try for low and hi E by using n leading jets and apply vars locally, not just globally

Stare at full HAWC event display

[Think: try StatPatternRecognition? Can tune on significance, not quadratic loss]

Image analysis: maybe Emanuel Strauss' code?

Sam:

Systematics—how?
Binning: is it finally settled?
    Look at ZEBRA/Zenith dependence
    Look at Mrk's (Sara). Are the spectra compatible GP vs NN
    Look at spectrum for Geminga

Crab paper/Sam/Jim:
add: histogram of pulls
Plots to demonstrate correct psf value (and/or tophat) at least in most important bins
    And/or table of for each bin size of tophat, fit angres,
    maybe ratio of excess with optimal tophat, 2*tophat or angres, 2*angres to see if as expected
value of chisquared from saturated likelihood, dof corresponding to p value
compare this chisq with naïve chisq from bin contents (1d, 2d).
    For crab, may have sufficient stats for most important bins
Standard 2d binning log parabola fits, comparison GP vs NN
Raw spectrum of photons vs ehat compare estimators
    All, and "most important" bins
    and ratio of observed photons / MC expected
        is it equivalent to correct raw / cut efficiency (as John did)
Distribution of difference of GP-NN vs ENN (several bins)
Nhit-only fit with new MC to compare fits with crab paper (before Pretz leaves May 21)
1-d fit vs Ehat for both estimators (with no bin-weighting, but summing tophats for fhit bins)
    Include chisq
Compare std weighted by 2d bins with 1d
ratios of raw photons per bin w/ expected for both 2d and 1d
Goodness of fit (with Jim)
Saturated likelihood p values, pulls
Projection of 2d fit down to 1d (Jim)

Pbh: Alison, Jim

- Get her Jim's talk, notes on spectrum method
- Israel's/Josh's code for GRB transient search (eg Zebra)

Joe:

DM all-sky

Homer work?

- What's missing from HAWCMon?
  - OR rates from Athena—who?
  - Day/night marker?
  - Missing Devices?