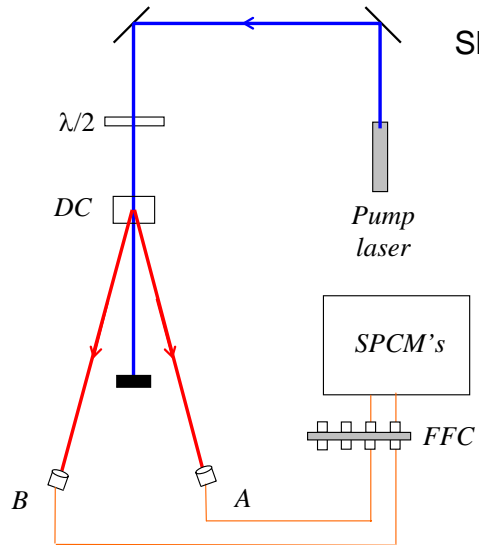


## Coincidence Measurements



Show:

- 1) Angular Correlations
- 2) Temporal Correlations

## Lasers

Type	Power (mW)	Wave-length (nm)	Price	Comments
Diode-Pumped, Frequency Doubled	20	409	\$5k	(40mW, \$6k)
Laser Diode	50	405	\$7.6k	Circularized Beam
Laser Diode	185	407	\$9.1k	Multi-Spatial Mode

Prices will come down in next few years  
 New DVD technology (HD-DVD, Blu-Ray) uses 405 nm lasers

## Lasers

These are full systems

- Power supply, TEC's, Collimation Optics...

Can get individual Laser Diodes

- 405nm, 35mW, \$2.6k (Thorlabs)

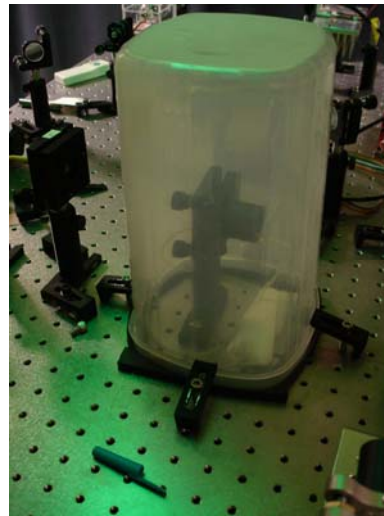
50mW System

- Works great!

185mW System

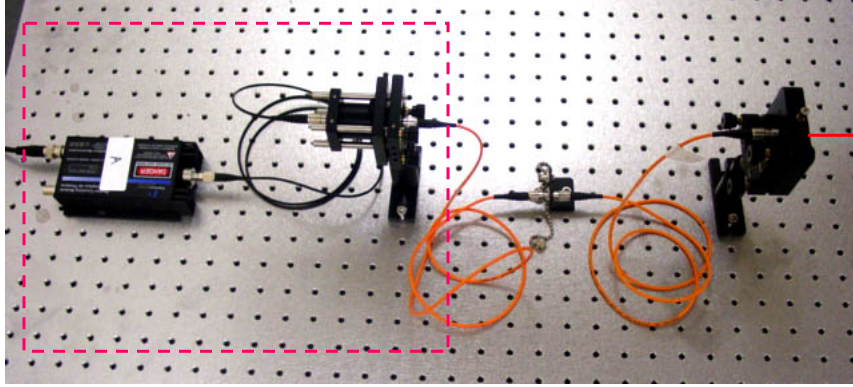
- Way more counts!
- Works great for non-entangled states
- Jury out on polarization entangled states
  - Entanglement not as good as 50mW source

## Protecting the Crystal

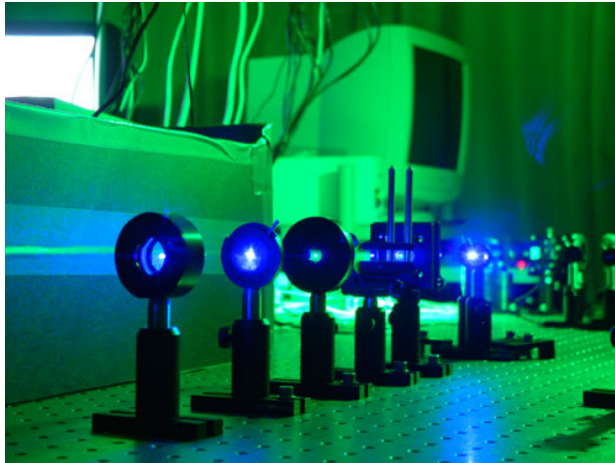


Desiccant at night

## Collection Optics



## Photon Count with the Lights on



Filters block green -- pass NIR

## Single Photon Counting Module

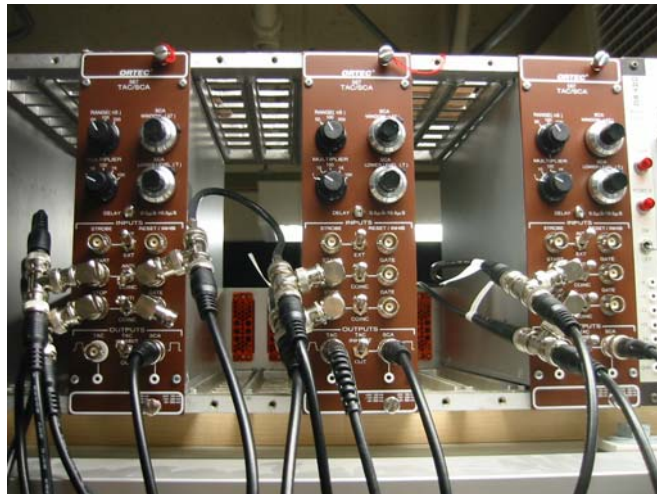


~\$9.5k with box

About 1/2 the cost of  
4 individual counters

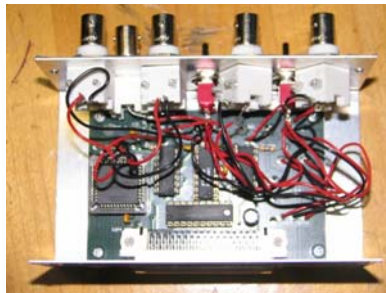
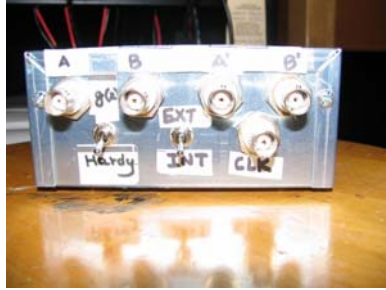


## Coincidence Electronics



~\$10k for 4 modules and crate

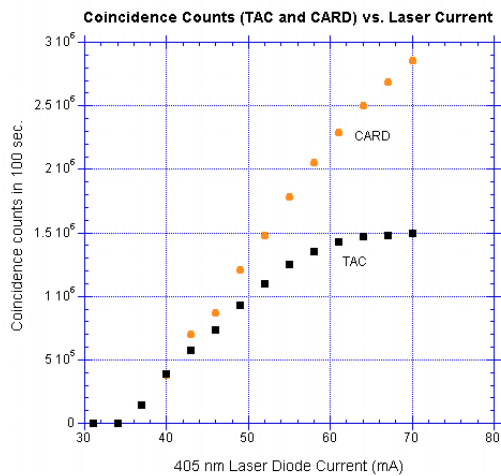
## New Coincidence Electronics



In collaboration with Dave Branning and Dave Ahlgren at Trinity College

~\$100

## New Coincidence Electronics



### Advantages

- Cheaper
- No dead time
  - Higher count rates

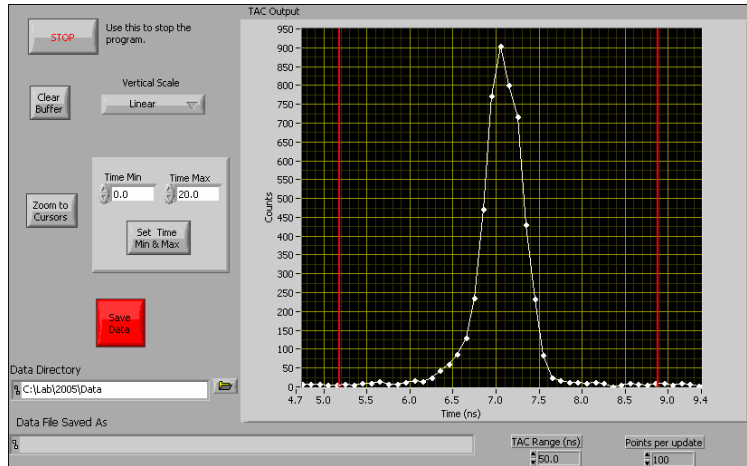
### Disadvantages

- Lower time resolution
  - Higher accidental rates

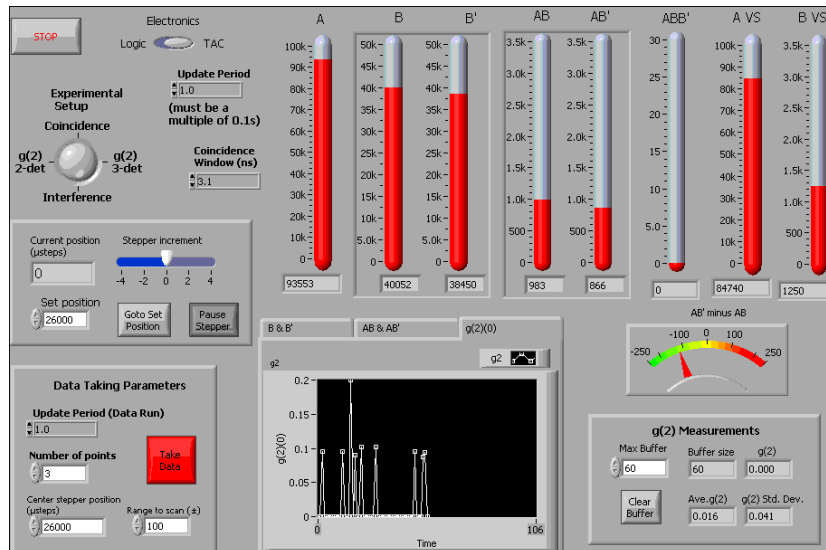
## Observing Temporal Correlations

### Cheap MCA

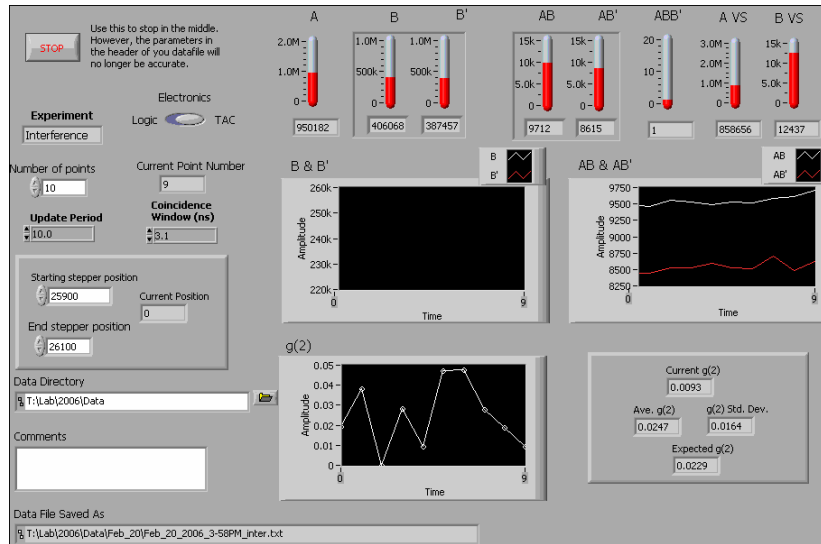
- Use trigger circuit, A/D converter, and LabView



## Tweaking

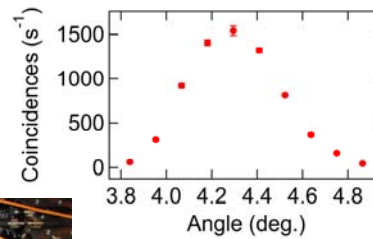
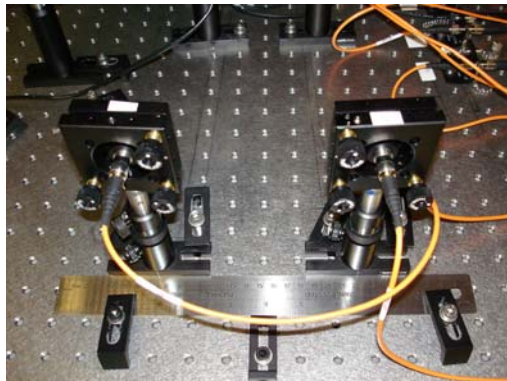


## Taking Data

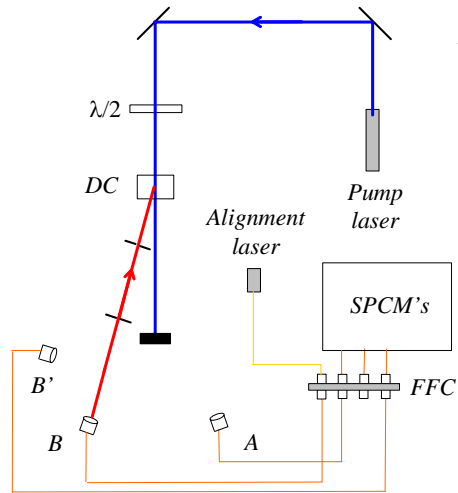


## Observing Angular Correlations

Slide detector along ruler

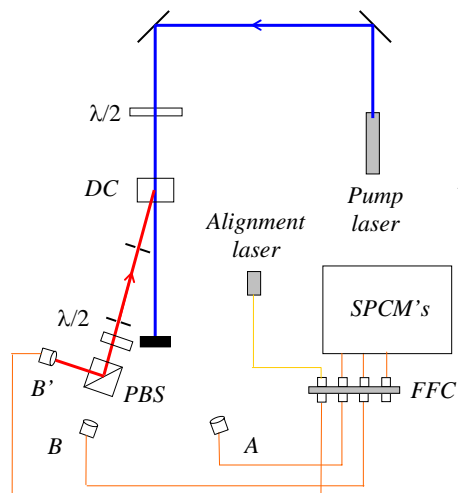


## Aligning Other Detectors



Align laser backwards through pinholes

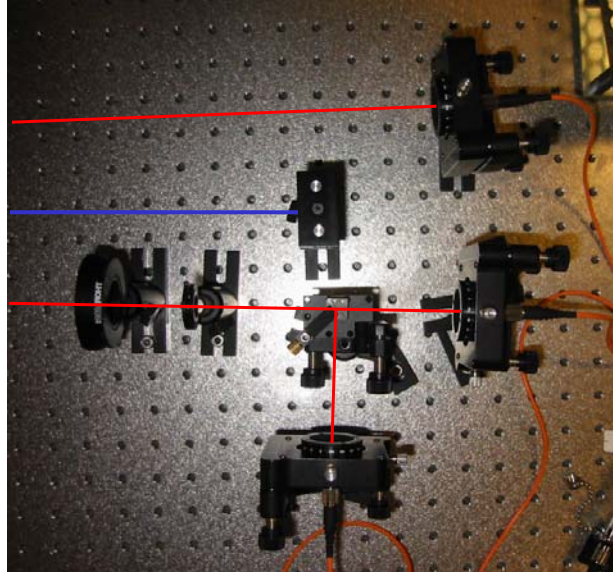
## Aligning Other Detectors



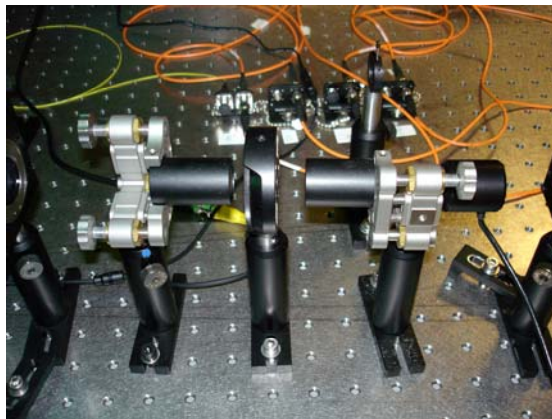
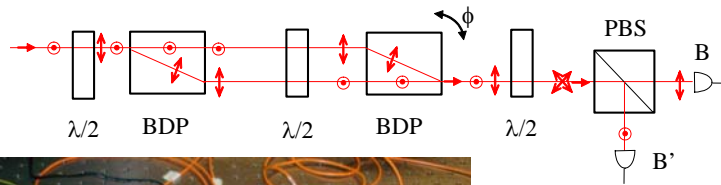
Insert PBS and B' detector

Align laser backwards through pinholes

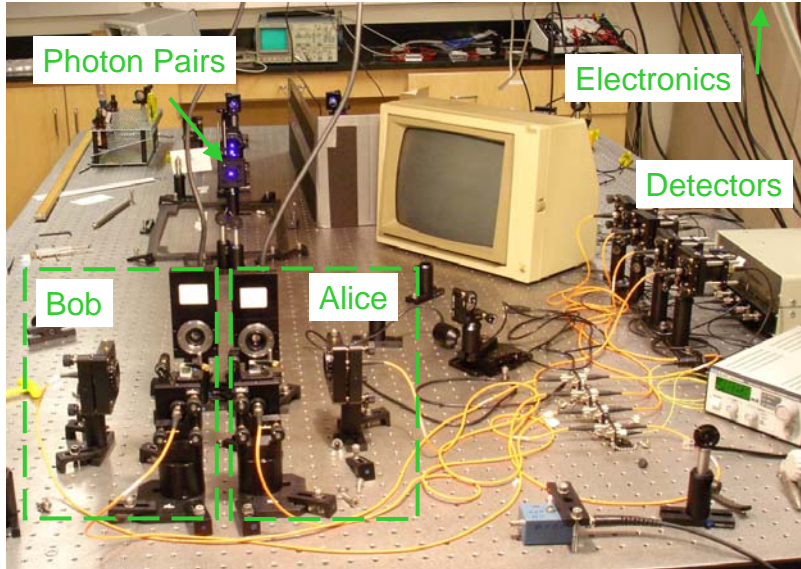
## Aligning Other Detectors



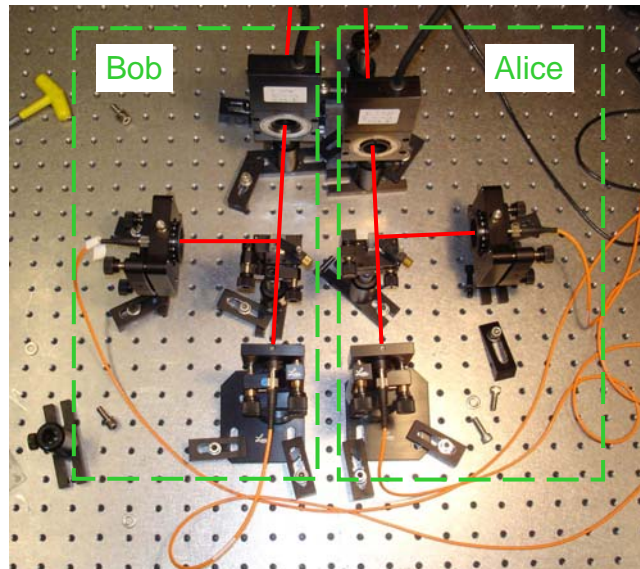
## Polarization Interferometer



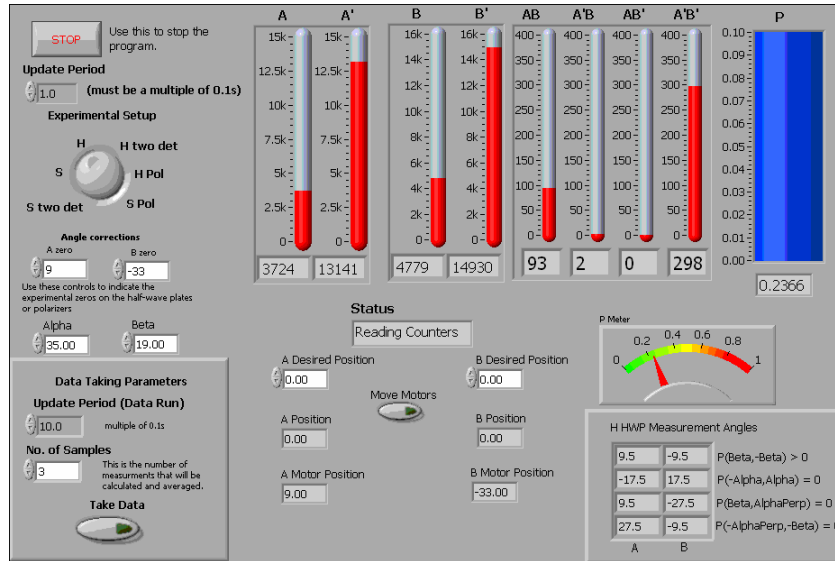
## Local-Realism Experiments



## Local-Realism Experiments



## Tweaking



## Taking Data

