A bit of background, *or*
Just what has Jason been doing for the last N years??

- HIRES/IRAS observations of interacting galaxies

- Adaptive optics (instrumentation, deconvolution algorithms)

- Circumstellar disks in T-Tauri stars

- High spatial resolution observations of Ultraluminous Infrared Galaxies and optical QSOs (near-UV/optical/near-IR/sub-mm imaging and spectroscopy)

Mid-IR Filler Observations of Giant Arcs in Clusters

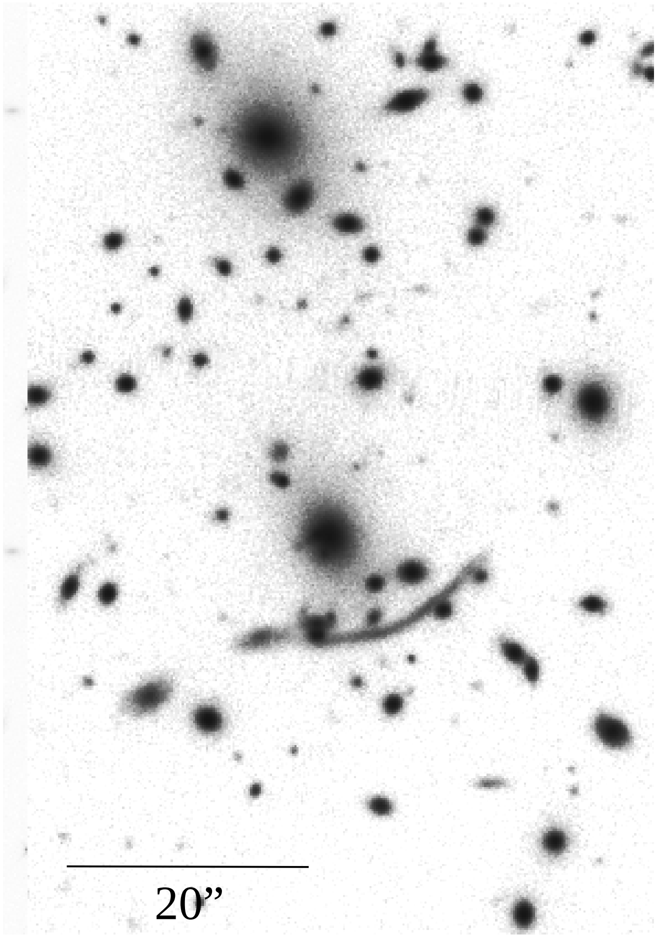
• Chosen to be largest known arcs with large radii of curvature to minimize confusion problems with low WIRE spatial resolution.

• Will provide info on mid-IR properties of lensed galaxies, as well as info on cluster members. This will be combined with the wealth of data on these objects at other wavelengths.

• This data may or may not be taken, depending on survey.

Abell 370

A large giant arc well separated from the cluster center will be just resolvable at 12 microns. R-L deconvolution will be useful.



High-Z Lensed Galaxies in the Primary Survey

• Expected lensing rate has been estimated (by me!) for a variety of evolutionary scenarios - typically **0.1-1%** of WIRE galaxies will be strongly lensed (amplification > 10).

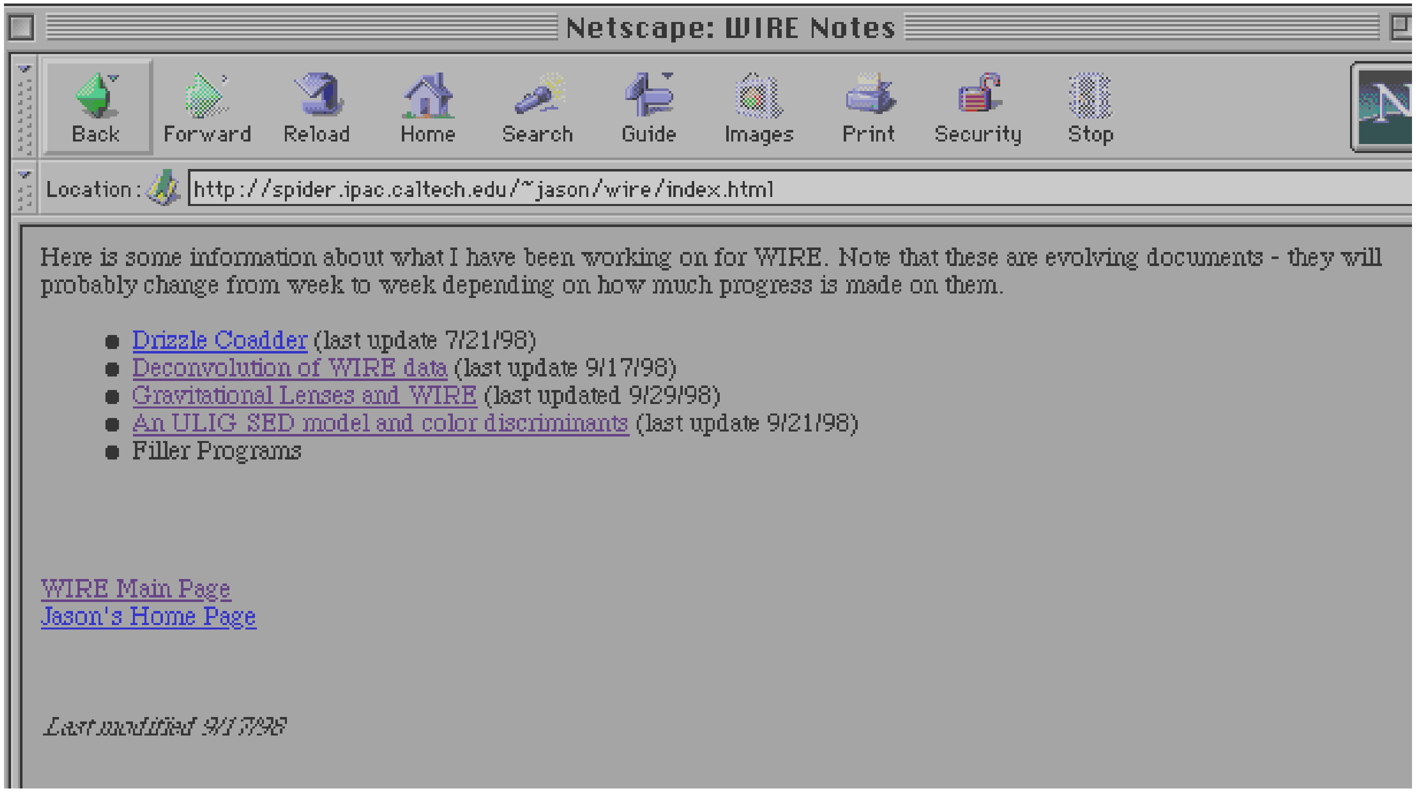
• These lenses may provide the only way to study high redshift sources at certain wavelengths (e.g. CO).

• Given the furor over FSC10214, a catalog of 100 or more such objects may be a major advance in the study of high redshift galaxies.

• These objects will be discovered as part of the redshift survey - due to amplification bias they will represent many of the z=2-3 objects.

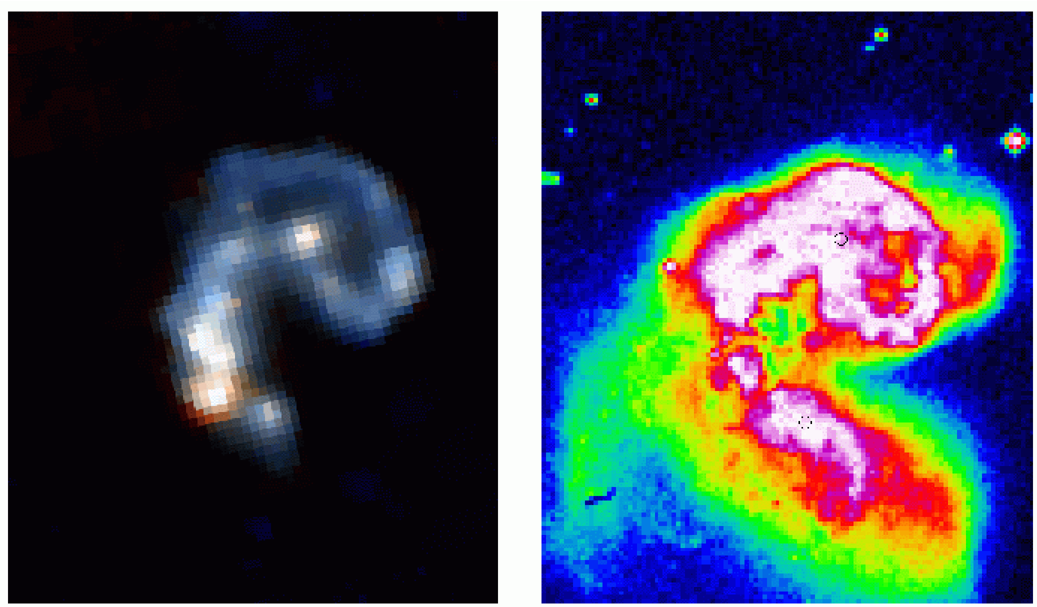
I maintain a web page that has detailed reports on some of my WIRE activites:

http://spider.ipac.caltech.edu/~jason/wire



Filler Observations of Nearby Interacting Galaxies

Recent ISO results have shown the spatial disparity between the easily observed optical/near-IR extended starbursts in interacting galaxies and the mid/far-IR emission which represents much of the luminosity.



Antennae Galaxy in mid-IR (left) and optical (right).

• In particular, this may also help answer questions regarding relationship between the optical starburst, CO, and the mid/far-IR emission.

• Interacting galaxy candidates chosen to be **near** enough and **large** enough to have structure resolvable by WIRE.

WIRE brightness constraints a serious problem!

• Chosen from KPG, Arp Atlas, Arp-Madore Atlas, and the Toomre Sequence.

- For many of the target galaxies, extensive ground-based optical and near-IR imaging and spectroscopy, as well as CO measurements, already exist.

- Details of which objects are done will depend on survey.

- For those objects observed, additional ground-based observations can be made. Sub-mm mapping might prove interesting.

The Really Good Stuff:

High Resolution Follow-up Observations of WIRE Ultraluminous Infrared Galaxies

• >90% of local ULIGs are "**major mergers**" between two gas-rich **nearly equal-mass L* galaxies**.

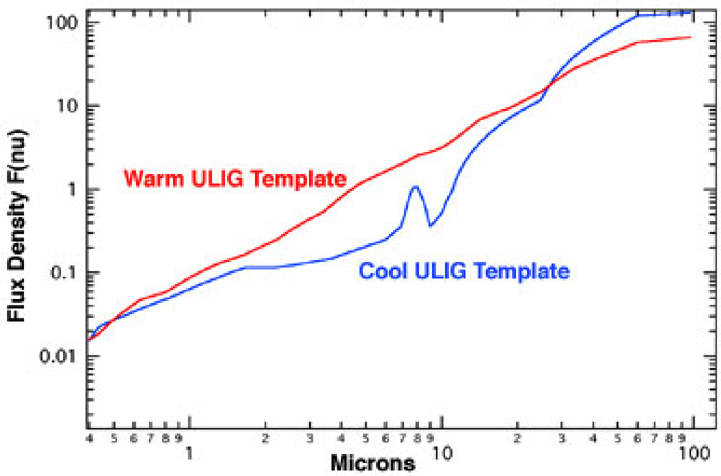
• Is this same merger phenomenon responsible for high-redshift high-luminosity systems? We might expect density evolution, and not luminosity evolution, for these systems.

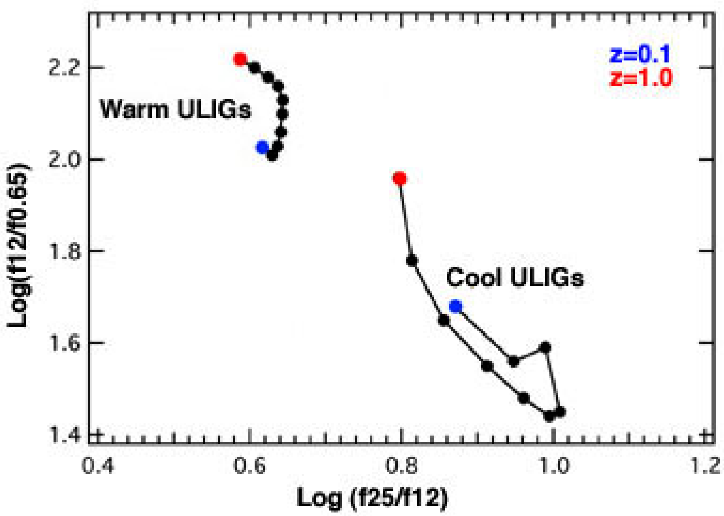
Can WIRE even see ULIGs like the local merger ULIGs?

• Detailed SEDs ranging from the **near-UV** to the **far-IR** have been assembled for the local ULIGs.

• Analysis of these SEDs indicates that the local ULIGs (like Arp 220 and Mrk 231) drop out of the 25 micron survey at redshifts of **1.5-3**.

• These SEDs have also allowed construction of possible color selection criteria that will help actively identify high-redshift "local-style" ULIGs.





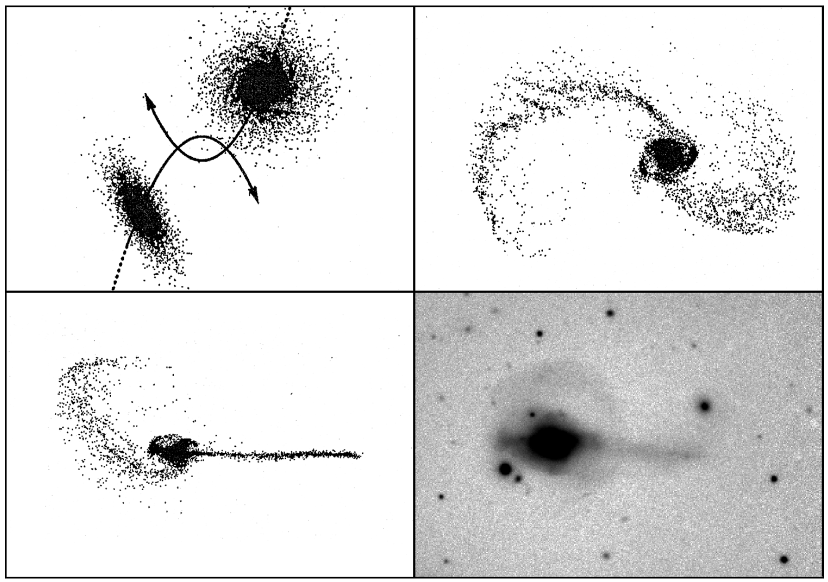
"Cool" ULIGs	max z
UGC 5101	1.2
IR 12112	1.4
Mrk 273	1.2
IR 14348	1.4
IR 15250	1.4
Arp 220	1.2
IR 22491	1.4
"Warm" ULIGs	
IR 05189	2.4
IR 08572	2.1
IR 12071	2.0
Mrk 231	2.9
Mrk 463	2.5
IR 15206	1.7

Is the high-redshift high-luminosity population that WIRE will presumably discover composed of objects like the local ULIGs, or are they something else entirely?

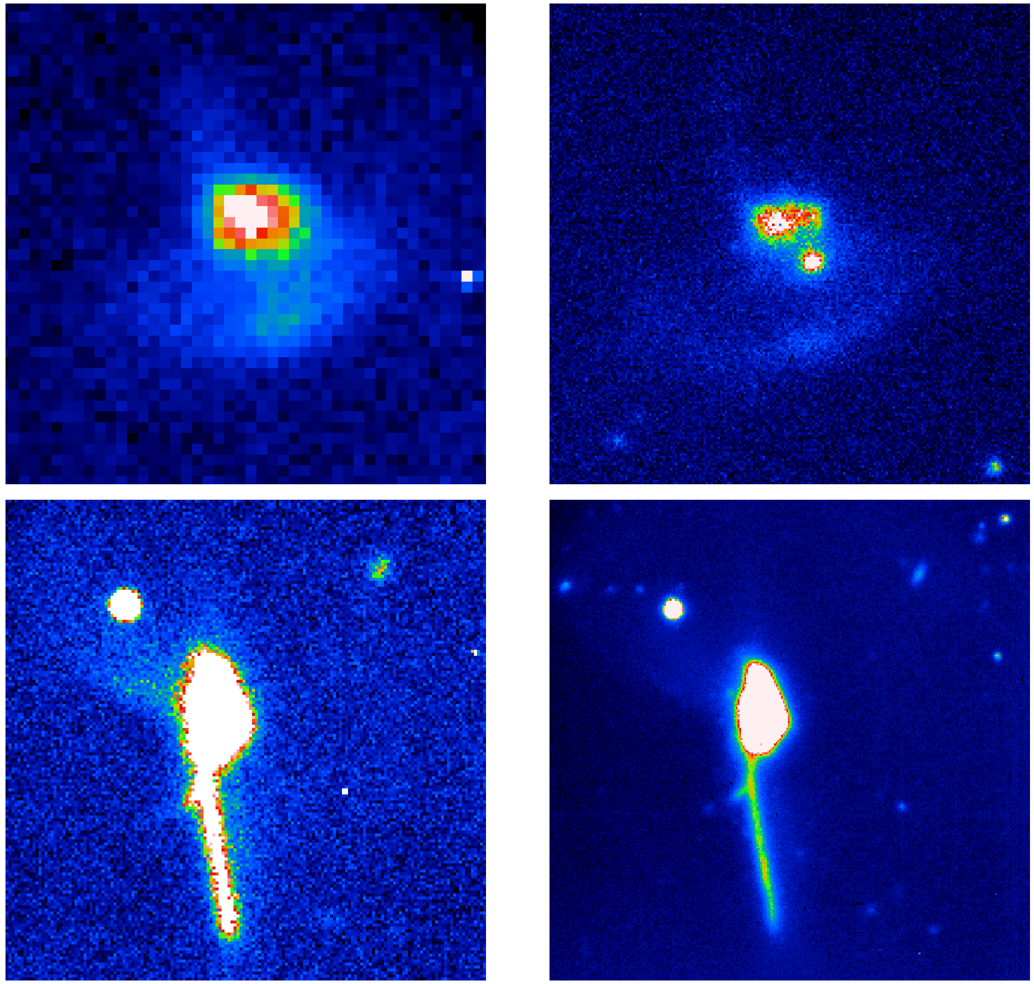
- High spatial resolution imaging will help - the angular diameter of the high redshift systems will still be roughly **10 arcseconds**. With adaptive optics on a large telescope searching for interaction tidal signatures and examining the details of star-formation will be fairly easy - the achieved physical resolution will be higher than what can be done now. Even without AO it is still doable.

- Choose 10 (previously identified) ULIG systems each at z=1 and z=2, without additional bias (however one does that), and image at I or H-band. Final observing decisions will be contingent on availability of instruments.

In particular, the nearly equal-mass mergers responsible for the local ULIGs have a characteristic morphology which is now well-understood based on n-body simulations.



• Application of predicted n-body merger morphologies will help interpret the origins of the high-z ULIGs.
• AO observations would also allow a detailed study of tidally-triggered clustered star-formation in high redshift galaxies.



Left: simulated 30-minute I-band exposures on Keck of local ULIGs at z=1(no AO). *Right:* 15-minute I-band exposures of local ULIGs from the UH 2.2m.