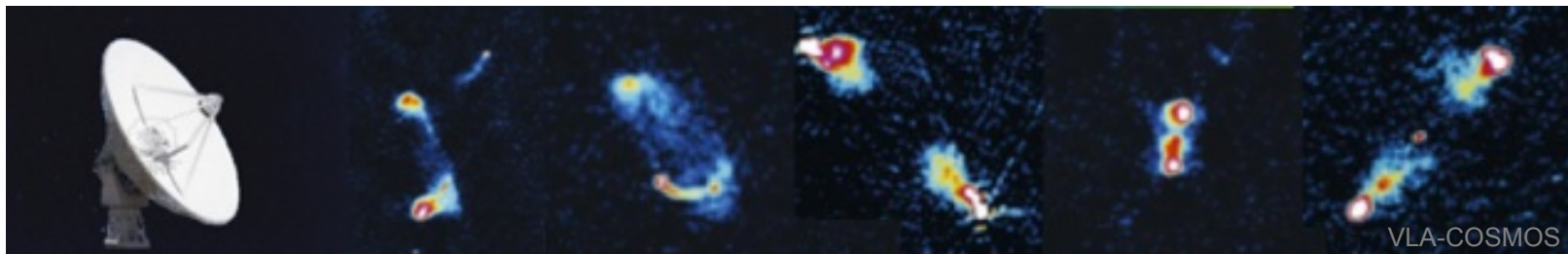




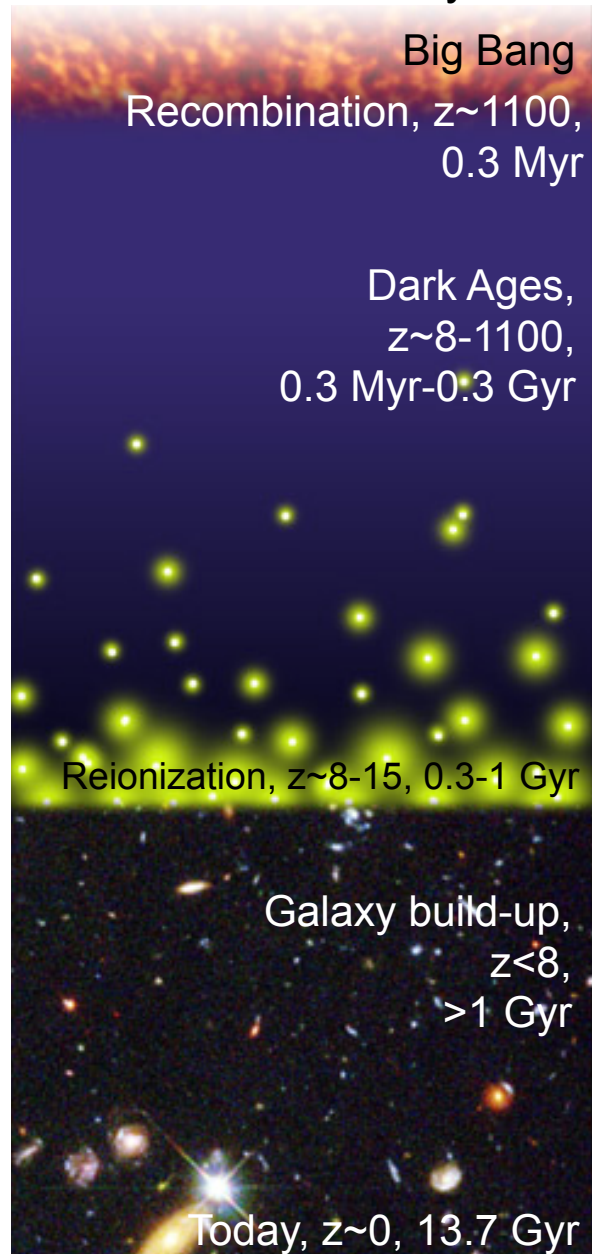
Constraining Stellar Mass and Supermassive Black
Hole Growth through Cosmic Times:
Paving the Way for next generation sky surveys

Vernesa Smolčić

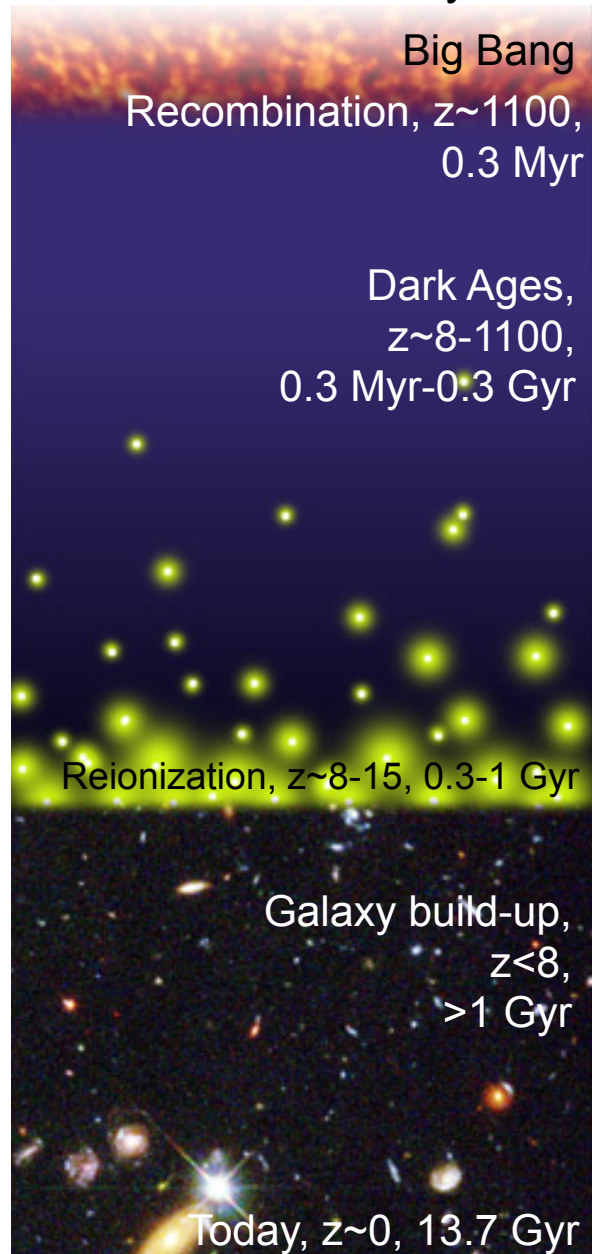
(Sveučilište u Zagrebu, PMF, Fizički odsjek)



Cosmic history



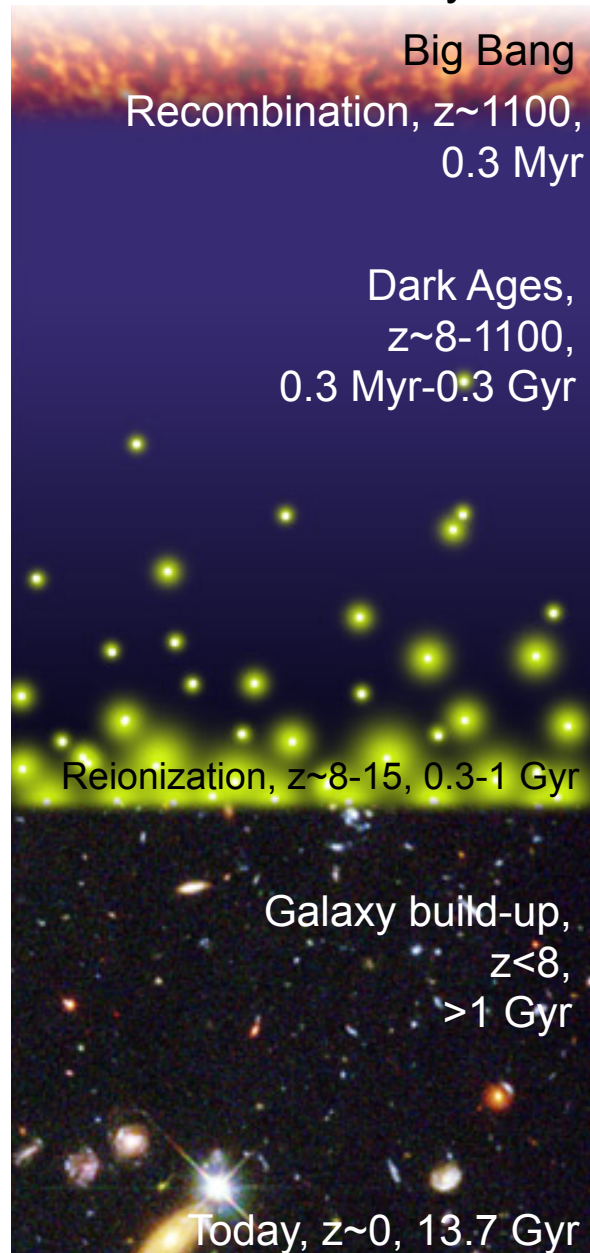
Cosmic history



Važan cilj moderne kozmologije

Razumjeti utjecaj stvaranja novih zvijezda te rasta supermasivnih crnih rupa u galaksijama pri stvaranju i razvoju galaksija

Cosmic history



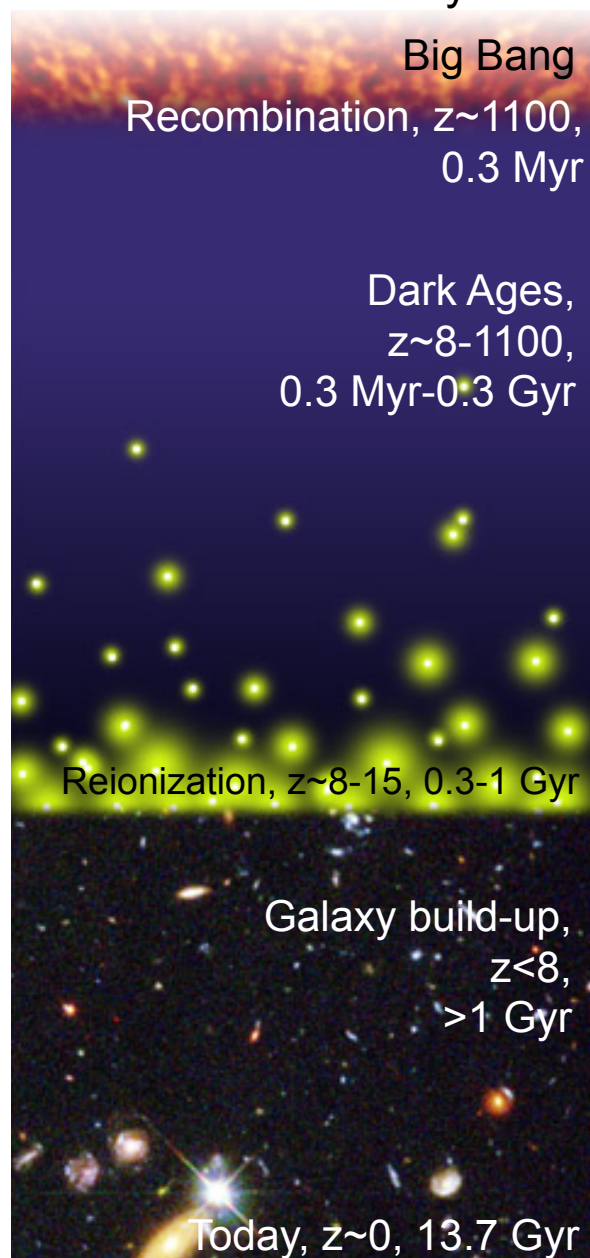
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Dostignuća prošlih dekada

Galaksije koje stvaraju zvijezde se pretvaju u 'tihe' galaksije kroz intenzivne faze stvaranja novih zvijezda te rasta supermasivnih crnih rupa u svemiru u kojem materija raste hijerarhijski

Cosmic history



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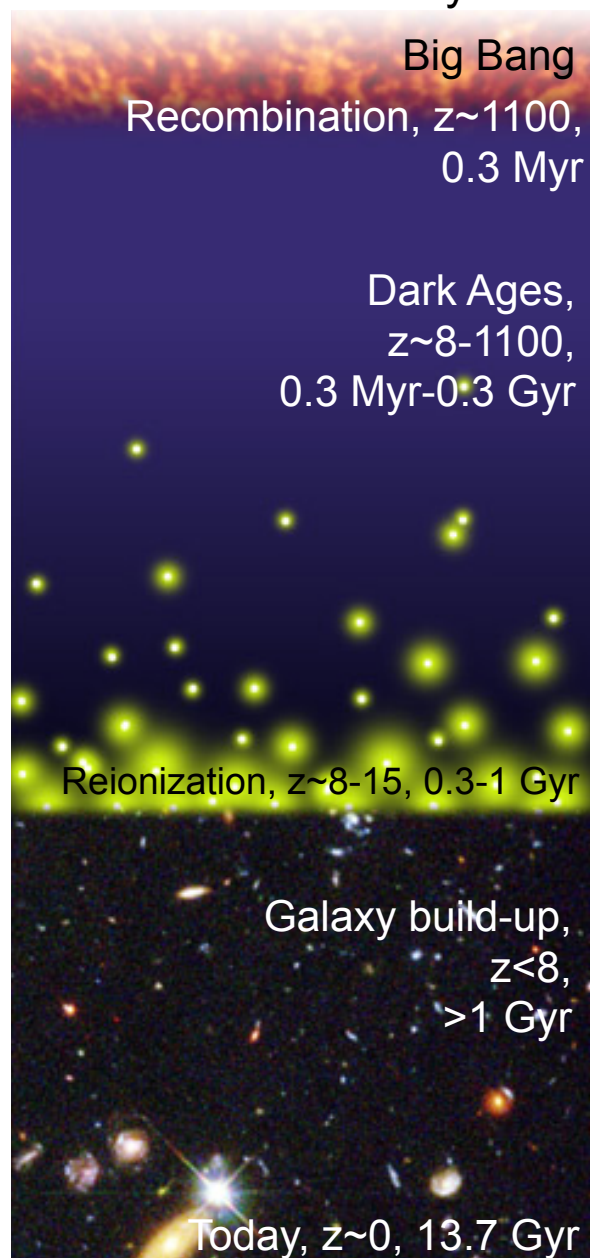
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Otvorena pitanja

- 1) Nepoznat utjecaj prašine na velikom crvenom pomaku → kozmička povijest stvaranja zvijezda?

Cosmic history



Važan cilj moderne kozmologije

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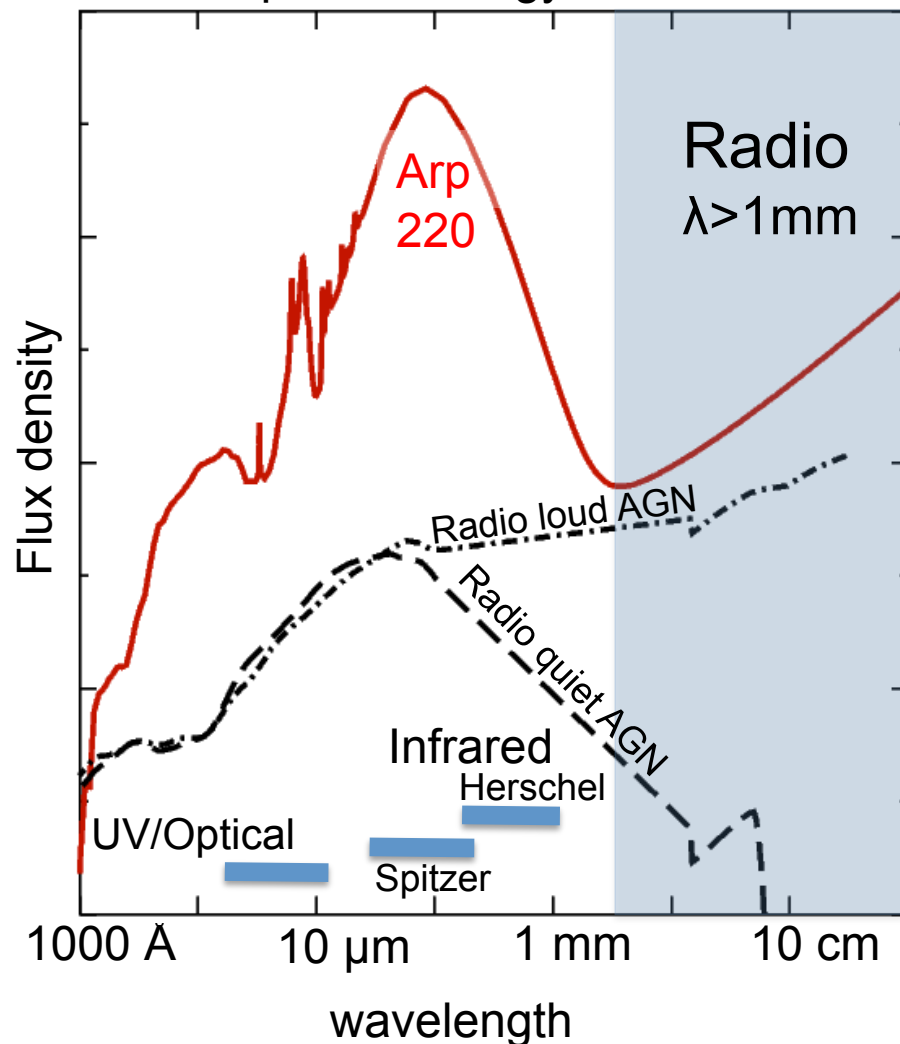
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Otvorena pitanja

- 1) Nepoznat utjecaj prašine na velikom crvenom pomaku \rightarrow kozmička povijest stvaranja zvijezda?
- 2) Postoji li populacija AGN-ova koja nam je do danas promakla? Potrebna promjena u jedinjenog modela AGN-ova?

Važnost radio područja

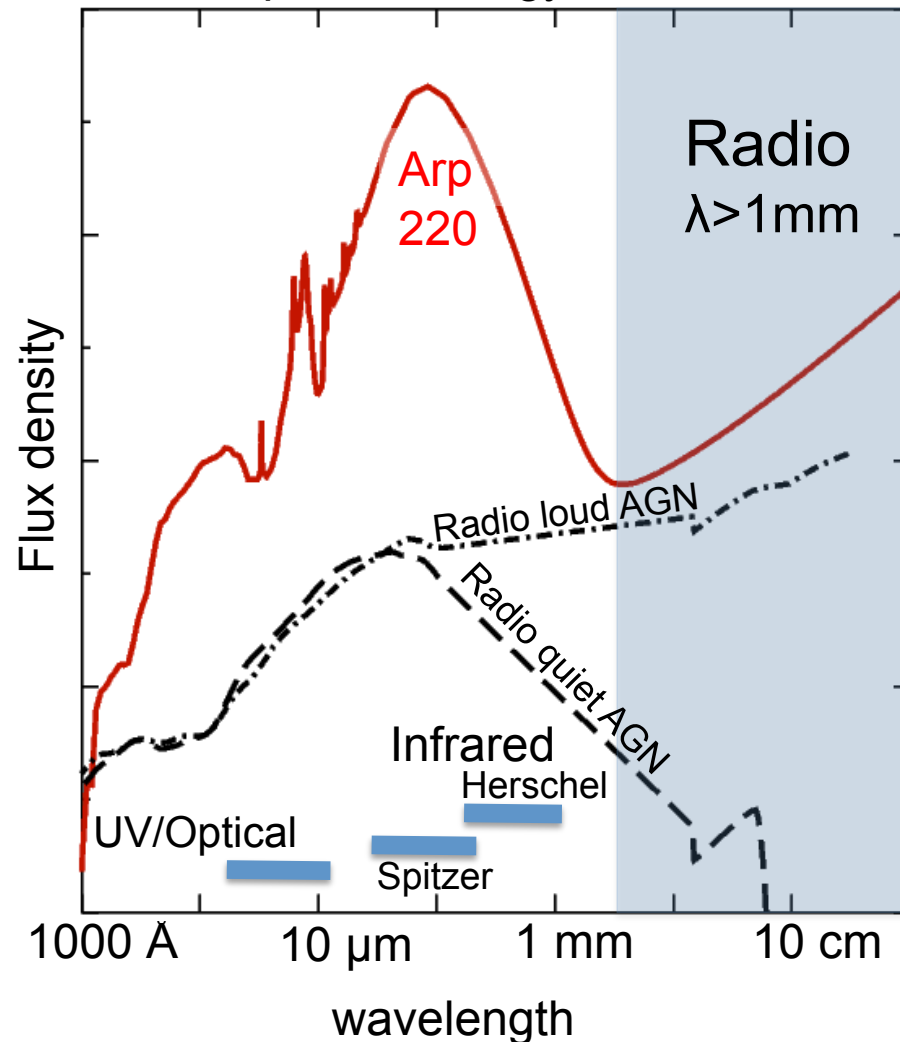
Spectral energy distribution



- 1) Direktna detekcija AGN-ova vidljivih samo u radio području

Važnost radio područja

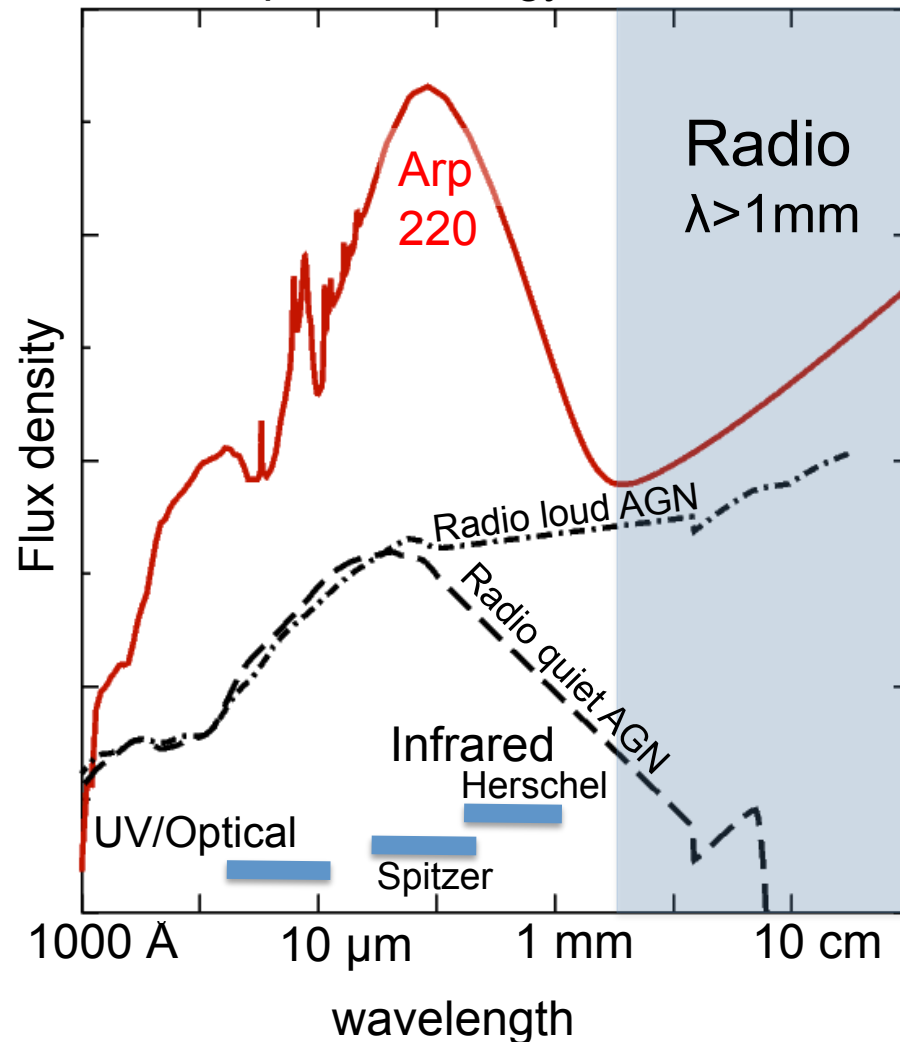
Spectral energy distribution



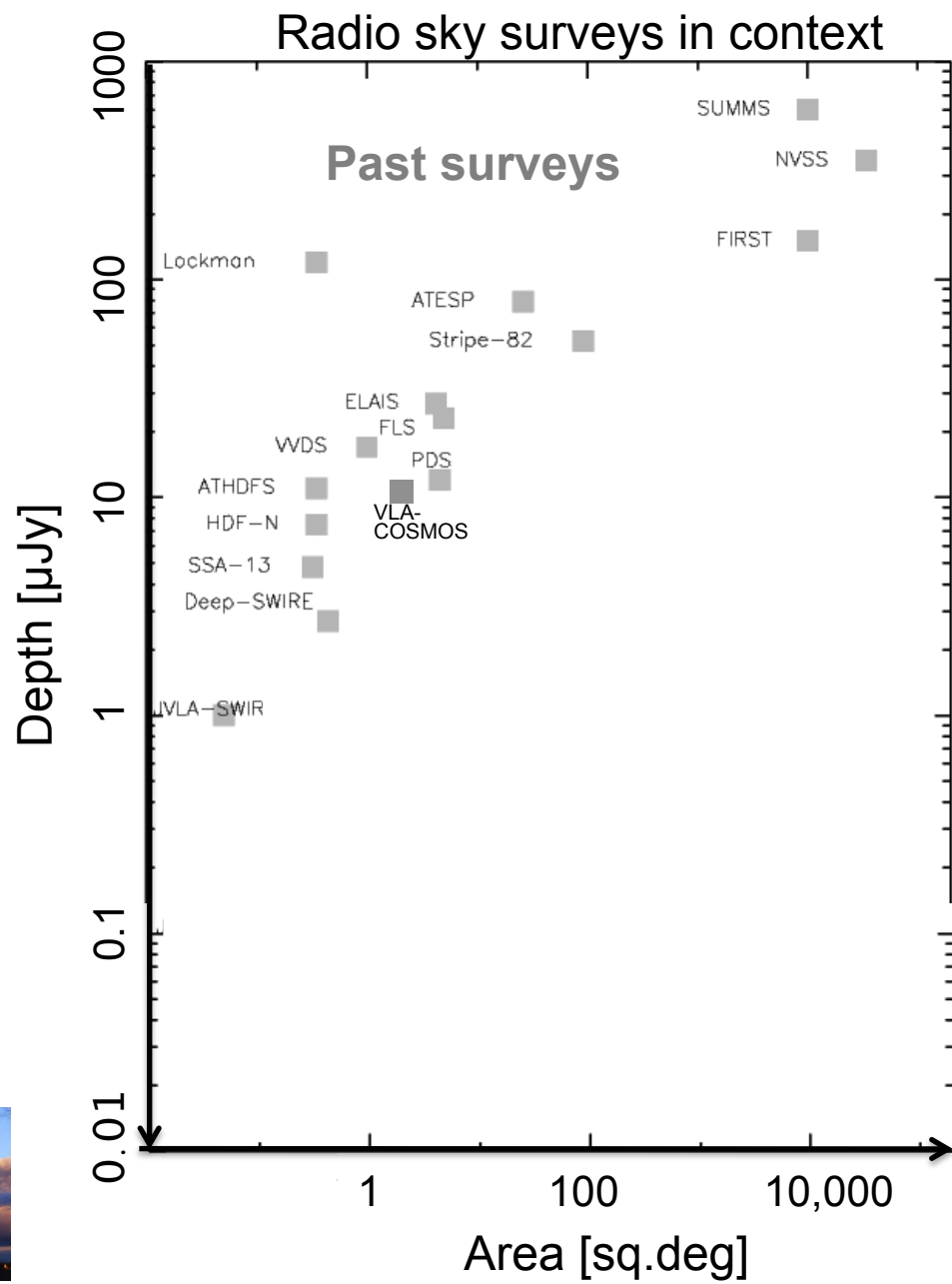
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- 2) Radio emisija neosjetljiva na prašinu + odlična razlučivost

Važnost radio područja

Spectral energy distribution



- 1) Direktna detekcija AGN-ova vidljivih samo u radio području
- 2) Radio emisija neosjetljiva na prašinu + odlična razlučivost
- 3) Ogroman skok u instrumentaciji:
Jansky VLA, ALMA, ATCA, LOFAR, SKA

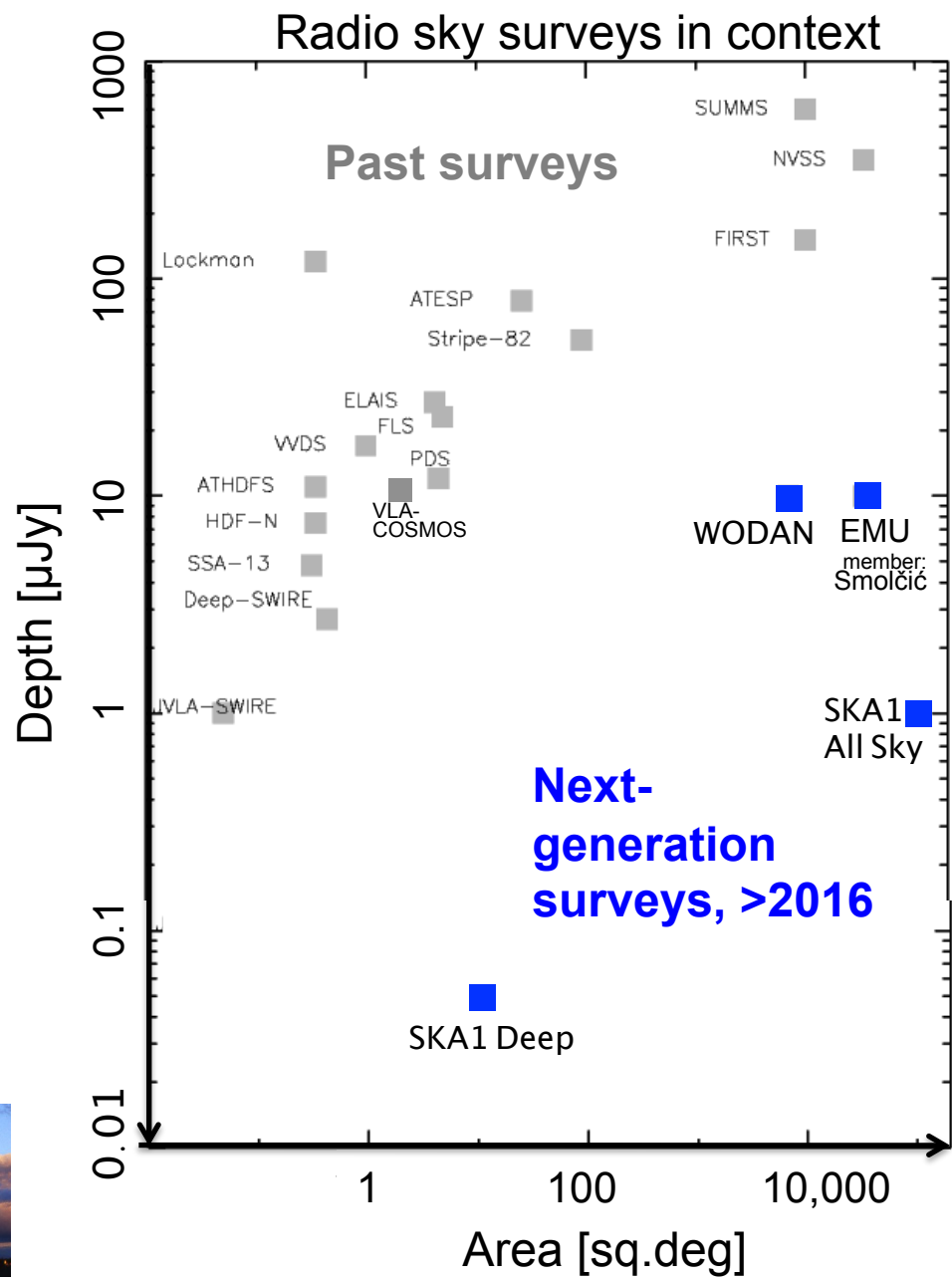




VLA



ATCA

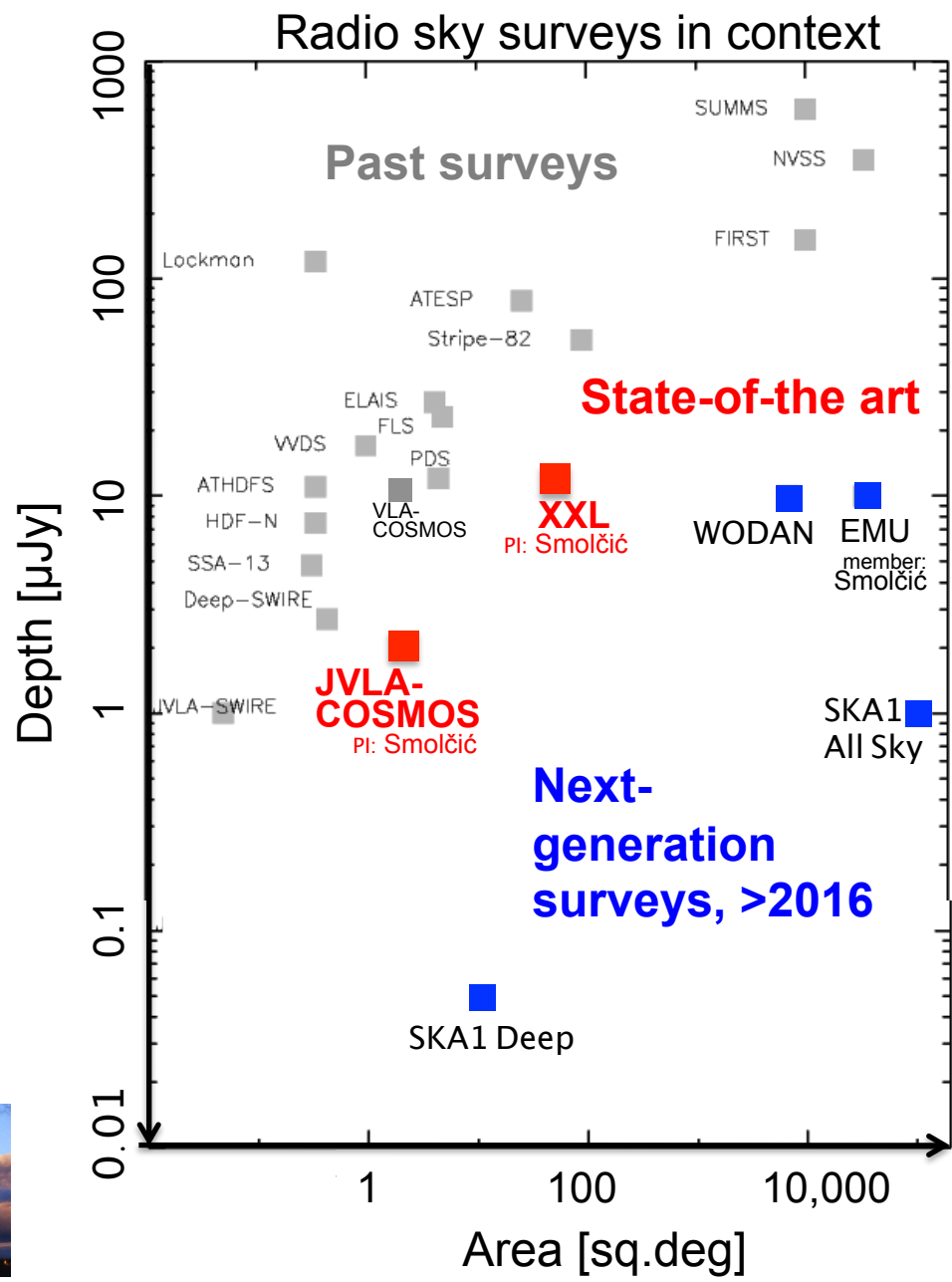




VLA



ATCA



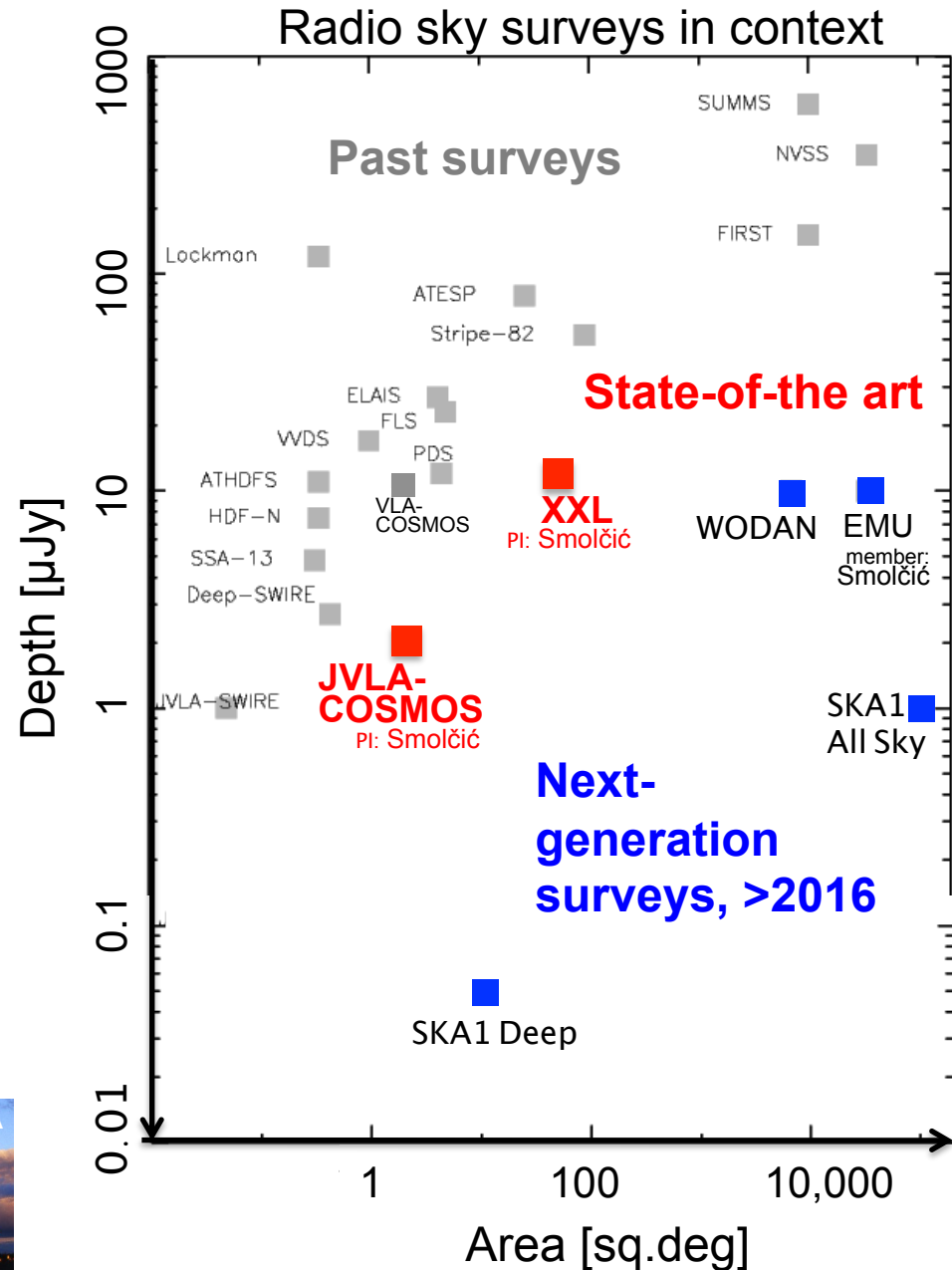
State_of_the_art

1) JVLA-COSMOS Large projekt

- ✓ Jedan od najvećih programa na JVLA ($\sim 400\text{h}$, $\lambda=10\text{ cm}$)
- ✓ Besprimjerna dubina, razlučivost i multi- λ pokriće (dubina $\sim 2\ \mu\text{Jy}$; res. $\sim 0.7''$, površina $2\ \square^\circ$)

2) Radio-XXL projekt

- ✓ JVLA, ATCA, GMRT ($\sim 130\text{h}$, $\lambda=10\text{--}50\text{cm}$, dubina $10\text{--}15\ \mu\text{Jy}$; površina $50\ \square^\circ$)
- ✓ Besprimjerna površina na toj dubini & gusto multi- λ pokriće



EU (ERC+CIG) projects: Understanding stellar mass and supermassive black hole growth across cosmic time

Project 1

The dust unbiased star formation history

Stellar mass build up of galaxies through cosmic time

Project 2

The importance of distant extreme starbursts

Project 3

Challenging the Unified model for active galactic nuclei

Supermassive black hole growth of galaxies through cosmic time

Project 4

Preparation for next generation surveys

ASKAP/
EMU, SKA,
CCAT



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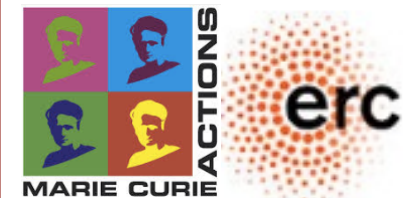
Preparation for next generation surveys

Stellar mass build up of galaxies through cosmic time

Supermassive black hole growth of galaxies through cosmic time

ASKAP/
EMU, SKA,
CCAT

- ⇒ 1.6 M€
- ⇒ Start 1.3.2013. (CIG) & 1.2.2014. (ERC)
- ⇒ Trajanje 4 (CIG) & 5 (ERC) godina
- ⇒ 3 postdoktora + 3 PhD studenta



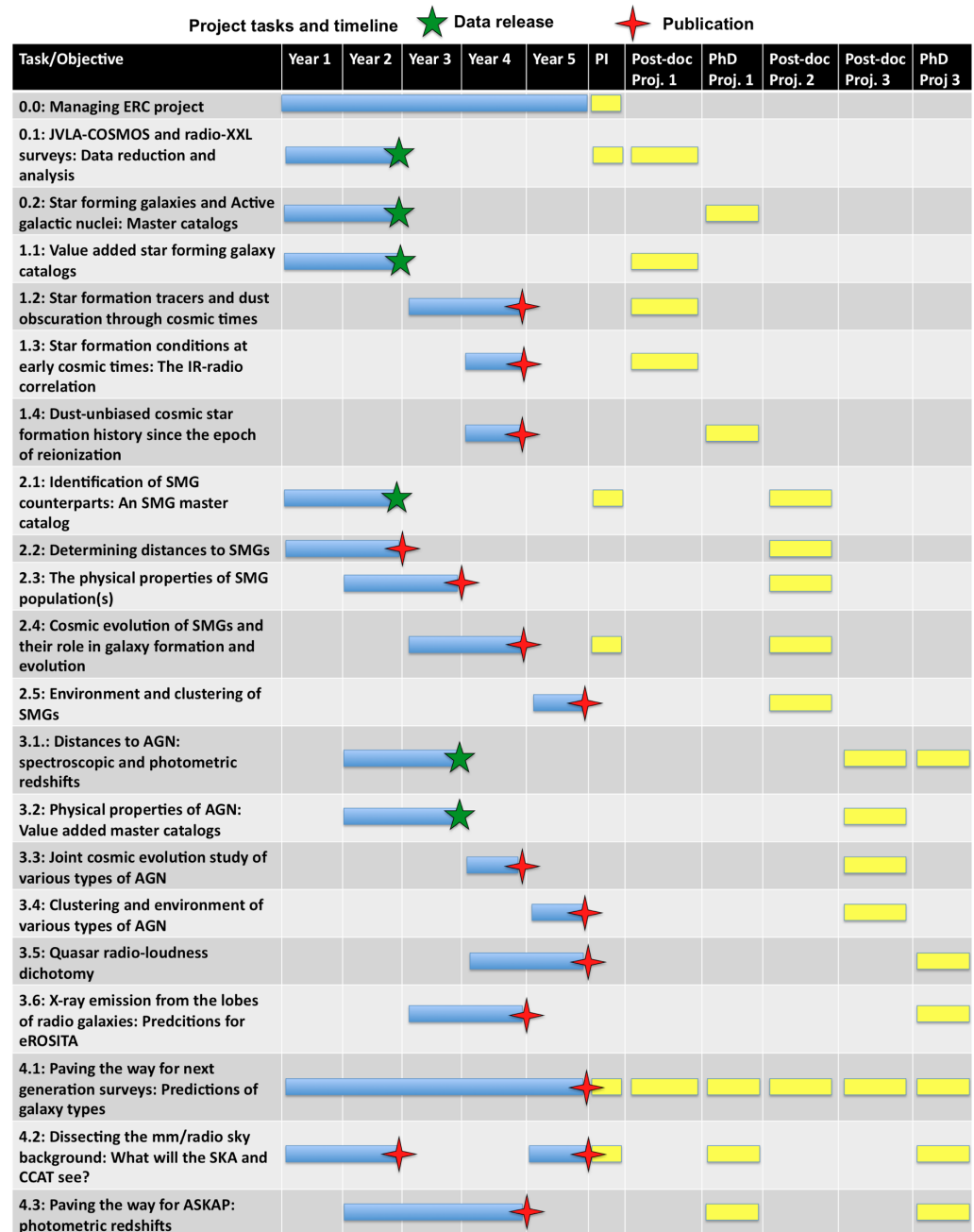
Project break-down

Outcomes:

- ✓ Razumijevanje okolnosti stvaranja zvijezda i AGN-ova kroz kozmičko vrijeme
- ✓ Postavljanje baze za buduće preglede neba
- ✓ 6 'data release' timovima/javnosti, preko 15 publikacija
- ✓ Popularizacija znanosti
- ✓ Edukacija 6-ero mladih znanstvenika

Match between PI & project:

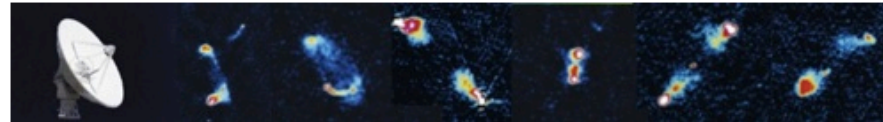
- ✓ Dugogodišnje iskustvo s radio i pankromatskim pregledima neba
- ✓ Internationalne kolaboracije
- ✓ Leadership/management:
~20 publikacija (glavni autor; H-index 29),
supervizija 5-ero studenata i mladih postdoktora
- ✓ Grantovi:
ERC Starting Grant (1.5M€)
MC FP7 Career Integration Grant 2013 (100k€)
Go8 Fellowship 2013 (20k\$)
Bosch Foundation Fast Track Prog. 2012 (2.4k€)
ESO ALMA COFUND Fellowship 2010 (~140k€)
UKF "Homeland visit" Grant 2009 (~10k€)



ZGal astro team: <http://zgal.phy.hr>

HOME PEOPLE RESEARCH EVENTS JOBS

ZGal



Constraining Stellar and Supermassive Black Hole Growth over Cosmic time:
Paving the Way for the Next Generation Sky Surveys

News

- ✓ Two postdoctoral positions open
- ✓ Two PhD positions open
- ✓ Jutarnji List, a Croatian daily newspaper, published an article about V. Smolcic in the Sunday Edition, Jul/14/13
- ✓ Jutarnji List, a Croatian daily newspaper, published an online article about the approval of the ERC Starting Grant Project led by V. Smolcic, Jul/03/13

Welcome to the homepage of ZGal, a research group at the University of Zagreb, Croatia, led by prof. Vernesa Smolcic. The group is mainly funded by the European Research Council Starting Research Grant ('CoSMass') and the European FP7-PEOPLE Career Integration Grant ('AGN Feedback').

Based on state-of-the-art survey data in the COSMOS and XXL fields newly acquired with JVLA, ATCA, PdBI, ALMA, Spitzer, and Chandra we focus on the exploration of:

- I) stellar mass growth in the universe via star formation processes
- II) highly starbursting, i.e. submillimeter galaxies
- III) supermassive black hole growth in the universe via a complete multi-wavelength census of active galactic nuclei.

