Cosmology/Astrophysics News

February 19, 2014
for Rose City Astronomers SIG

http://101iq.com/RCA

• Cool start to hydrogen ionization
  – [http://www.nature.com/nature/journal/v506/n7487/full/nature13051.html](http://www.nature.com/nature/journal/v506/n7487/full/nature13051.html)
  – Studying the heating of primordial hydrogen by x-rays from stars, galaxies, black holes... about 1 billion years after the big bang

• Cold dark matter heats up
  – [http://www.nature.com/nature/journal/v506/n7487/full/nature12953.html](http://www.nature.com/nature/journal/v506/n7487/full/nature12953.html)
  – Significant outflow of gasses during galaxy formation might explain the distribution of dark matter
Science – Feb. 7, 2014

- China Build Mammoth Detector To Probe Mysteries of Neutrino Mass
  - https://www.sciencemag.org/content/343/6171/590.summary
- Which neutrinos are heavier?... Are neutrinos their own antiparticle?...
Nature – Feb. 6 2014

• Hydrogen river could fuel stars
  – [http://www.nature.com/nature/journal/v506/n7486/full/506008c.html](http://www.nature.com/nature/journal/v506/n7486/full/506008c.html)
  – Discovered a “river” of hydrogen in intergalactic space connecting to NGC6946... future galaxy surveys might confirm if this is true or is drawn out from neighbors

• How big galaxies died fast
  – [http://www.nature.com/nature/journal/v506/n7486/full/506009d.html](http://www.nature.com/nature/journal/v506/n7486/full/506009d.html)
  – Giant galaxies burned out ~3 billion years after big bang due to intense star formation, using up all of the gas
• The Proton Radius Problem
  – New measurement using muons shows proton to be 4% smaller (0.8409fm instead of 0.877fm) than expected… may lead to new science… more experiments planned

• Supernova seen in nearby galaxy
  – Type Ia supernova SN2014J in M82 (11.4 million light years away) in Ursa Major

• Stephen Hawking questions nature of black holes
  – http://www.nature.com/news/stephen-hawking-there-are-no-black-holes-1.14583
  – Event horizon incompatible with quantum theory

• Solar System evolution from compositional mapping of the asteroid belt
  – http://www.nature.com/nature/journal/v505/n7485/full/nature12908.html

• A Global cloud map of the nearest known brown dwarf
  – http://www.nature.com/nature/journal/v505/n7485/full/nature12955.html
Science – Jan. 24, 2014

• Habitability, Taphonomy, and the Search for Organic Carbon on Mars
  – [http://www.sciencemag.org/content/343/6169/386.full](http://www.sciencemag.org/content/343/6169/386.full)
  – A number of articles about the search for past life on Mars

• Rosetta wakes up and phones home
  – Spacecraft to visit comet Churyumov-Gerasimenko, soft landing a probe in November

• Evaporating asteroid
  – http://www.nature.com/nature/journal/v505/n7484/full/505487a.html
  – Herschel Space Observatory shows Ceres spewing water from its surface
• Star-Crossing Planets Literally Strut Their Stuff
  – http://www.sciencemag.org/content/343/6168/240.summary
  – New method used to find many mini-Neptune size planets, smallest detected outside solar system

• Probing the Electron
  – http://www.sciencemag.org/content/343/6168/255.summary
  – http://www.sciencemag.org/content/343/6168/269.abstract
  – New experiment sets the upper bound of a possible electric dipole moment for an electron \(<8.7\times10^{-29}\) e-cm, predicted to be less than \(10^{-38}\) e-cm

• Kepler clue to supernova puzzle
  – Latest findings suggest type 1a supernova come from merging white dwarfs

• The Heart of Darkness
  – http://ngm.nationalgeographic.com/2014/03/black-holes/finkel-text
  – Spinning supermassive black holes, in about March all eyes on object G2 expected to merge with black hole Sagittarius A* at center of our galaxy, testing general relativity

• The Great Unseen
  – http://www.nature.com/nature/journal/v505/n7483/full/505290a.html
  – Hayden planetarium show visualizing dark matter distribution in universe

• Black hole found orbiting a fast rotator
  – http://www.nature.com/nature/journal/v505/n7483/full/505296a.html
  – Black hole found orbiting a fast rotating type Be star, accretion disk rotates too fast to feed black hole
Science – Jan. 10, 2014

• Rare Celestial Trio to Put Einstein’s Theory to the Test
  – [http://www.sciencemag.org/content/343/6167/126.summary](http://www.sciencemag.org/content/343/6167/126.summary)
  – Strong equivalence principle (inertial mass = gravitational mass) to be tested with pulsar – 1.4 solar mass spins 266 times per second, with 0.2 and 0.41 solar mass white dwarves

• Transient Water Vapor at Europa’s South Pole
  – [http://www.sciencemag.org/content/343/6167/171.abstract](http://www.sciencemag.org/content/343/6167/171.abstract)
  – Water vapor appears irregularly probably due to changing surface stresses

• Comets hint at cosmic encounter
  – [http://www.nature.com/nature/journal/v505/n7482/full/505134a.html](http://www.nature.com/nature/journal/v505/n7482/full/505134a.html)
  – Comet belt found around exoplanet and star: Fomalhaut A

• The rarity of dust in metal-poor galaxies
  – [http://www.nature.com/nature/journal/v505/n7482/full/nature12765.html](http://www.nature.com/nature/journal/v505/n7482/full/nature12765.html)
  – Galaxies with redshift z>6 when universe less than billion years old rarely show dust from star formation

• An Exceptionally Bright Gamma-Ray Burst
  – [http://www.sciencemag.org/content/343/6166/34.summary](http://www.sciencemag.org/content/343/6166/34.summary)
  – Four papers about supernova GRB130427A... in a tiny galaxy in Leo detected April 27, 2013:
    – [http://www.sciencemag.org/content/343/6166/38.abstract](http://www.sciencemag.org/content/343/6166/38.abstract)
    – [http://www.sciencemag.org/content/343/6166/38.abstract](http://www.sciencemag.org/content/343/6166/38.abstract)
    – [http://www.sciencemag.org/content/343/6166/51.abstract](http://www.sciencemag.org/content/343/6166/51.abstract)

• Chasing universes
  – [http://www.nature.com/nature/journal/v505/n7481/full/505024a.html](http://www.nature.com/nature/journal/v505/n7481/full/505024a.html)
  – Review of Max Tegmark’s book “Our Mathematical Universe: My Quest for the Ultimate Nature of Reality” – remarkably in tune with my paper:

• Cloudy with a chance of dustballs
  – [http://www.nature.com/nature/journal/v505/n7481/full/505031a.html](http://www.nature.com/nature/journal/v505/n7481/full/505031a.html)
  – Investigating exoplanet atmospheres as they pass their stars plus findings for two planets GJ436b and GJ1214b:
    – [http://www.nature.com/nature/journal/v505/n7481/full/nature12887.html](http://www.nature.com/nature/journal/v505/n7481/full/nature12887.html)
    – [http://www.nature.com/nature/journal/v505/n7481/full/nature12888.html](http://www.nature.com/nature/journal/v505/n7481/full/nature12888.html)

• Strong neutrino cooling by cycles of electron capture and beta- decay in neutron star crusts
  – [http://www.nature.com/nature/journal/v505/n7481/full/nature12757.html](http://www.nature.com/nature/journal/v505/n7481/full/nature12757.html)

• The Search for Life on Faraway Moons
  – http://www.nature.com/scientificamerican/journal/v310/n1/full/scientificamerican0114-38.html
  – Looking for habitable moons around exoplanets

• The Ultimate X-ray Machine
  – http://www.nature.com/scientificamerican/journal/v310/n1/full/scientificamerican0114-64.html
  – Stanford’s Linac Coherent Light Source (LCLS) X-ray source is used to study exotic matter and take high speed images of molecules

• The Case Against Copernicus
  – http://www.nature.com/scientificamerican/journal/v310/n1/full/scientificamerican0114-72.html
  – Because diffraction of light was not yet understood, at that time science supported the case that Copernicus must not be correct