

## 13. Glossary

**2MASS:** Two Micron All Sky Survey, an infrared sky survey led by the University of Massachusetts Amherst.

**ACBAR:** Arcminute Cosmology Bolometer Array Receiver, a project of the University of California at Berkeley and Case Western Reserve University.

**ACT:** Atacama Cosmology Telescope, a multi-institutional project to build a telescope in Chile for cosmological research.

**AGN:** active galactic nuclei.

**ARO:** Arizona Radio Observatory, comprising two radio telescopes operated by the University of Arizona.

**ALMA:** Atacama Large Millimeter Array, being built in Chile by a European-U.S.-Japanese collaboration.

**APEX:** Atacama Pathfinder Experiment, a collaboration of the Max-Planck Institute for Radio Astronomy, the Astronomical Institute at the University of Bochum, the European Southern Observatory, and the Onsala Space Observatory to build a 12 m radio telescope for sub-mm observations in Chile's Atacama desert.

**ASTRO-F:** a proposed U.K. infrared satellite observatory.

**AU:** astronomical unit, the average distance from the Earth to the Sun.

**AzTEC:** Astronomical Thermal Emission Camera, a bolometric camera with 144 pixels that will be one of the initial LMT instruments (see Section 8.2.1).

**BATSE:** Burst Alert and Transient Source Experiment on the CGRO (see below).

**Beppo-SAX:** an Italian X-ray satellite observatory.

**BLAST:** Balloon-borne Large Aperture Sub-millimeter Telescope, a multi-institutional project to fly a balloon-borne telescope for far infrared observations.

**C++:** a computer language.

**CARMA:** Combined Array for Research in Millimeter-wave Astronomy, operated by the California Institute of Technology and the University of California at Berkeley.

**CBI:** Cosmic Background Imager, a special purpose radio telescope in the Chilean Andes operated by a U.S.-Canada-Chile partnership.

CDM: cold dark matter, the unknown component that makes up some 80% of the matter in current models of the universe, the remaining 20% consisting of baryons.

Centaur: an icy, rocky body from a few to several hundred kilometers in size, orbiting the Sun in the region of the giant planets.

CfA: Center for Astrophysics, a collaboration between Harvard University and the Smithsonian Astrophysical Observatory.

CGRO: Compton Gamma-Ray Observatory, a satellite facility that was one of NASA's "great observatories."

CMB: cosmic microwave background.

CMBPol: a proposed NASA mission to measure the Cosmic Microwave Background Polarization.

CO: carbon monoxide, the most abundant trace gaseous constituent of dense interstellar clouds.

coma: the atmosphere of a comet, formed by gas sublimating from the nucleus as the nucleus is heated by the Sun.

CONACyT: Consejo Nacional de Ciencia y Tecnología, the federal agency supporting scientific and technological research in Mexico.

CORBA: Common Object Request Broker Architecture, a vendor-independent architecture and infrastructure that computer applications can use to work together over networks.

CRyA: Centro de Radioastronomía y Astrofísica of UNAM, located in Morelia, Michoacan, Mexico.

CSO: Caltech Sub-millimeter Observatory in Hawaii.

CTIO: Cerro Tololo Inter-American Observatory in Chile.

dB: decibel.

ERO: extremely red object, a category of presumably very distant galaxies.

ESA: European Space Agency.

ESO: European Southern Observatory, which operates several astronomical facilities in Chile.

EVLA: Expanded Very Large Array, a project to increase the sensitivity of NRAO's (see below) Very Large Array by an order of magnitude.

FBC: Flexible Body Compensation, the system designed by MAN Technologic for the LMT that uses a computer model to calculate deformations of the telescope structure under various conditions, so that corrections can be made with the active surface.

FCRAO: Five College Radio Astronomy Observatory, operated by the University of Massachusetts Amherst.

FIR: far infrared.

FSB: frequency selective bolometer.

FWHM: full width half maximum, a measure of the beam size of a radio telescope.

GBT: Green Bank Telescope, operated by NRAO (see below) in West Virginia, U.S.A.

GHz: gigahertz,  $10^9$  Hertz, a unit of frequency.

GLAST: Gamma-ray Large Area Space Telescope, a joint project of the U.S., France, Italy, Japan, and Sweden, scheduled for launch in 2007.

GMC: giant molecular cloud, the concentrations of interstellar gas and dust where new stars form.

GRB: gamma-ray burst, a short-duration pulse of gamma rays from a celestial source.

GSFC: Goddard Space Flight Center, a NASA center in Greenbelt, Md.

GTC: Gran Telescopio Canarias, a 10.4 m optical telescope in Spain.

GUI: graphical user interface for a computer system.

HII region: the region around a hot star within which hydrogen in the ISM (see below) is ionized by the stellar ultraviolet radiation.

HEMT: high electron mobility transistor.

Herschel: an ESA (see above) satellite telescope for infrared and mm observations, scheduled for launch in 2007.

heterodyne: a system to combine a received radio signal of a given frequency with a signal of a different frequency to produce frequencies equal to the sum and the difference of the two original signals.

HST: Hubble Space Telescope.

HzRG: high redshift ( $z$ ) radio galaxy.

IA-UNAM: Instituto de Astronomía, Universidad Nacional Autónoma de México, located in Mexico City.

IF: intermediate frequency (in reference to heterodyne receivers).

INAOE: Instituto Nacional de Astrofísica, Óptica y Electrónica located in Tonantzintla, Puebla, Mexico; the Mexican partner in the LMT project.

InP: the chemical compound indium phosphide.

IR: infrared.

IRAM: Institut de Radio Astronomie Millimétrique, a French-German-Spanish collaboration operating telescopes in France and in Spain.

ISM: interstellar medium, the gas, dust, and radiation between the stars.

Java: a computer language.

JCMT: James Clerk Maxwell Telescope, a joint U.K.-Dutch-Canadian millimeter/sub-millimeter wavelength telescope in Hawaii.

JNI: Java Native Interface, the native programming interface for Java.

JPL: Jet Propulsion Laboratory, a NASA facility operated by the California Institute of Technology in Pasadena, Calif.

JWST: James Webb Space Telescope, the planned successor to the Hubble Space Telescope.

KBO: Kuiper Belt Object, an icy body in the outer solar system beyond the orbit of Neptune.

kpc: kiloparsec, a thousand parsecs.

LAN: local area [computer] network.

LMT: Large Millimeter Telescope.

LMTO: Large Millimeter Telescope Observatory, which will operate the LMT (see Chapter 11).

LO: local oscillator (in reference to heterodyne receivers).

LSB: Lower SideBand of a heterodyne receiver.

MAMBO: MAX-Planck Millimeter BOLometer, a continuum array receiver on the IRAM (see above) 30 m telescope.

MBH: massive black hole, a black hole at the center of a galaxy that may have a mass millions or even billions of times that of the Sun.

MHD: magneto-hydrodynamic, fluid processes in which magnetic effects on charged particles must be taken into account.

micron: micrometer, one millionth of a meter.

MMIC: monolithic microwave integrated circuit.

MPC: Management Program for Conservation, a program plan required by the Mexican government for regions designated as Protected Areas in order to protect the environment.

Mpc: megaparsec, a million parsecs.

NASA: U.S. National Aeronautics and Space Administration.

NRAO: U.S. National Radio Astronomy Observatory.

NEO: Near Earth Object, an asteroid or comet whose orbit approaches or crosses that of Earth.

NSF: National Science Foundation, a federal agency supporting basic research in the United States.

OMAR: One Millimeter Array Receiver, a heterodyne focal plane array receiver system planned for the LMT (see Section 8.5.2).

Oort Cloud: the approximately spherical cloud of comets orbiting the Sun and extending a significant fraction of the distance to the nearest star; proposed by Dutch astronomer Jan Oort as the source of the long-period comets.

pc: parsec, the distance at which a star has a parallax of one arcsec, equal to 3.26 light years or  $3.09 \times 10^{13}$  km.

QUEST: Q and U Extra-galactic Sub-mm Telescope, a proposed U.K.-Ireland-U.S. instrument to measure the polarization of the cosmic microwave background.

Red Giant Branch: a late stage in the evolution of a star.

RMS (or rms): root mean square, a measure of the error or uncertainty in a measurement.

RQQ: radio quiet quasar.

SCUBA: Sub-millimeter Common Use Bolometer Array, a continuum instrument on the JCMT (see above).

SDSS: Sloan Digital Sky Survey, a survey of about one quarter of the sky at optical wavelengths.

SEQUOIA: SEcond QUabbin Optical Imaging Array, a 32-element focal plane array for spectroscopy that will be one of the initial LMT instruments (see Section 8.3.1).

SETI: the search for extraterrestrial intelligence, usually applied to radio searches for intelligent signals from other civilizations in the Milky Way.

SFR: star formation rate.

SgrA\*: the compact radio source at the center of the Milky Way Galaxy, thought to be powered by a massive black hole.

SIS: superconducting-insulating-superconducting, a type of junction used in some millimeter-wavelength receivers.

SN: supernova.

solar nebula: the disk of gas and dust from which the Sun and Planets formed.

SPEED: SPEctral Energy Distribution camera, a bolometer for the LMT that uses frequency selective bolometers to simultaneously measure power in four frequency bands (see Section 8.2.2).

Spitzer Space Telescope: that one of NASA's "great observatories" optimized for observations in the infrared; formerly known as SIRTF.

SSB: single sideband (in reference to heterodyne receivers).

STAC: Scientific and Technical Advisory Committee, an advisory body for the LMT project.

STScI: the NASA Space Telescope Science Institute.

SWAS: Submillimeter-Wave Astronomy Satellite, a NASA-multi-university satellite observatory to study emission from interstellar water and other molecules.

Swift: a NASA gamma-ray and X-ray satellite observatory.

S-Z effect: Sunyaev-Zel'dovich effect, produced by the interaction of CMB (see above) photons with hot electrons in the inter-galactic medium.

TAC: Time Allocation Committee, a committee deciding how to allocate observing time on a telescope.

TES: transition edge superconducting sensor (see Section 8.2).

UMass Amherst: the University of Massachusetts campus in Amherst, Massachusetts, U.S.A.; the American partner in the LMT project.

USB: Upper SideBand of a heterodyne receiver.

VLBA: Very Long Baseline Array, an array of radio telescopes operated by NRAO (see above).

VLBI: Very Long Baseline Interferometry, combining the signals from two or more widely separated radio telescopes to achieve very high angular resolution.

XML: Extensible Markup Language, the computer language used for the LMT Monitor and Control system (Section 7.3).

XMM: a proposed ESA (see above) X-ray satellite observatory.