Space Studies of the Earth-Moon System, Planets, and Small Bodies of the Solar System (B)
Lunar Science and Exploration (B0.1)

RADIO ASTRONOMY FROM THE MOON

Baptiste Cecconi, baptiste.cecconi@obspm.fr
LESIA, CNRS, Observatoire de Paris, Meudon, France
Philippe Zarka, philippe.zarka@obspm.fr
Observatoire de Paris Meudon, Meudon, France
J-L. Bougeret, jean-louis.bougeret@obspm.fr
Observatoire de Paris Meudon, Meudon, France
Jan Bergman, jb@irfu.se
$SwedishInstituteofSpacePhysics, Uppsala, Sweden$
$Jean-MathiasGriessmeier, jean-mathias.griessmeier@cnrs-orleans.fr$
$LPC2E/CNRS-UniversityofOrleans, France$
$CarineBriand, carine.briand@obspm.fr$
$LESIA, CNRS, ObservatoiredeParis, France$
$ArnaudZaslavsky, arnaud.zaslavsky@obspm.fr$
$LESIA, CNRS, ObservatoiredeParis, Meudon, France$
$HeinoFalcke, h.falcke@astro.ru.nl$
$RadboudUniversiteitNijmegen, Nijmegen, Netherlands$
$AAminaei, a.aminaei@astro.ru.nl$
$RadboudUniversiteitNijmegen, Netherlands$
$MarcKlein-Wolt, kleinwolt@stcorp.nl$
$ScienceandTechnology, Netherlands$
$LeonidGurvits, lgurvits@jive.nl$
$JointInstituteforVLBIinEurope, Dwingeloo, Netherlands$
$AlexanderKonovalenko, akonov@ira.kharkov.ua$
$Ukraine$
$HuubRoettgering, rottgering@strw.leidenuniv.nl$
$Netherlands$
$BoThide, bt@irfu.se$
$SwedishInstituteofSpacePhysics, Uppsala, Sweden$
$GrahamWoan, graham.woan@glasgow.ac.uk$
$UniversityofGlasgow, UnitedKingdom$
$MikeGarrett, garrett@jive.nl$
$ASTRON, Netherlands$
$NectariaGizani, ngizani@eap.gr$
$HellenicOpenUniversity, Patra, Greece$
$BrianHicks, brian.hicks@nrl.navy.mil$
$NavalResearchLaboratory, Wyoming, UnitedStates$

DivyaOberoi, doberoi@haystack.mit.edu
MassachusettsInstituteofTechnology, UnitedStates
MamtaPandey − Pommier, mamtapan@gmail.com
CRAL, Lyon, France
KennethStewart, kenneth.stewart@nrl.navy.mil
NavalResearchLaboratory, UnitedStates
KurtWeiler, kurt.weiler@nrl.navy.mil
NavalResearchLaboratory, UnitedStates
LinjieChen, ljchen@nao.cas.cn
NAOC, China
YanYihua, yyh@nao.cas.cn
NAOC, China
Jean − JacquesBerthelier, jean − jacques.berthelier@latmos.ipsl.fr
LATMOS − IPSL/CNRS, Saint − MaurDesFoss, France
ValCiarletti, valerie.ciarletti@latmos.ipsl.fr
LATMOS/IPSL/CNRS/UVSQ, France
AliceLeGall, alice.legall@latmos.ipsl.fr
LATMOS/IPSL/CNRS/UVSQ, France
FarsideExplorerConsortium

Very interesting radio astronomy science below 10-20 MHz can be carried out from the lunar surface. Although a large radio array on the Moon's surface is a long-term goal, useful pathfinder experiments should be carried out with relatively simple instrumentation. Here we present some of the precursor radio measurements needed to carry out radio astronomy from the Moon, as well as lunar environment and pathfinder studies. These will be based on the use of a small number of dipole antennas connected to receivers performing spectrometry and waveform capture. We show that at least two co-located crossed dipoles connected to a dual-input receiver are required to measure the polarization and k-vector (i.e., direction of arrival) of incoming radio waves, and thus perform zero-order sky mapping with an accuracy of a few degrees. At least one additional widely-separated dipole antenna, together with waveform capture snapshots, will allow us to perform interferometric measurements, constraining the angular extent and localization of the most intense radio sources, and build average sky maps by global inversion of the measured interferometric visibilities. With the addition of a sounder (emitter) and an impedance measurement circuit, a radio astronomy instrument may also be used as a Ground Penetrating Radar, probing the lunar subsurface. We will discuss typical instrument characteristics, required performances, resources, interfaces, heritage (with examples of measurements e.g. by Cassini at Saturn), and TRL. We will also mention the comparisons, cross-calibrations, ionospheric riometry, and VLBI measurements that can be performed via coordinated measurements with large ground-based arrays such as LOFAR, UTR-2, or the Nançay Decameter Array.