

**20th International EISCAT Symposium
and
15th International Workshop on Layered Phenomena
in the Mesopause Region (LPMR)**

Sundbyholm Castle, Sweden, August 14-19, 2022

Programme

Status: 2022-08-12

<https://www.space.irfu.se/workshops/LPMR-EISCAT>

General Instructions

Oral presentations:

Invited talks are scheduled for 25 minutes plus 5 minutes discussion. Contributed talks are scheduled for 15 minutes plus 5 minutes discussion.

At the conference center, you can use our conference computer or your own computer to show your presentation. If you want to use your own computer, you will need to run Zoom on your computer (for the hybrid sessions) and we need to test in advance that everything works. A meeting microphone is available (Jabra Speak510). In any case, we want you to upload your presentation to our conference computer as a backup solution.

Presentation upload: Please upload the files needed for your presentation to the IRF cloud at <https://cloud.irf.se/s/WDDaAeGTTSAF7GG>, at latest on the day prior to your presentation. On the IRF Cloud, there is one folder for each session, the alphabetic order corresponds to the sequence in time. Please keep this kind of order also within the sessions: provide each main presentation with a file name that starts with the scheduled time coded as "hhmm" followed by the first author name and the title (or abbreviations thereof).

Testing your presentation: Please test your presentation as soon as possible on our conference computer or by connecting your computer to the presentation system. This can be done in lecture hall "Riddarsalen" either at 8:30-8:55 (before the morning session) or during the coffee breaks. If you use your own computer, we will also need to check whether your Zoom setup works.

Online participation:

Most sessions will be run in a hybrid mode with presenters both in place and online. (An exception are the LPMR sessions on Tuesday afternoon that will not be available online.) The Zoom link is

<https://irf-se.zoom.us/j/62535420511?pwd=REpRNvdNOWxWWUQybWdRTHJJdFRLdz09>

Presently you first get to a waiting room, from where the host will let you in.

Instructions for remote presenters: The default is that you start sharing your screen when it is time to present. There are other options, in particular if you have an unstable internet connection: We can share your uploaded presentation from our conference computer. Or you may provide a pre-recorded presentation, e.g. on YouTube.

If anyone in the lecture hall prefers to watch presentations via Zoom on your own computer, please mute your microphone and loudspeakers completely, in order to avoid feedback to the presenter's microphone.

Posters:

Posters should be prepared in portrait format, with a maximum width of 90 cm. Posters will be on display all week in lecture hall “Riddarsalen”. There is a scheduled poster session on Wednesday at 14:00-16:00. In addition, there are possibilities for individual discussions during all coffee breaks.

Poster upload: Similar to the oral presentation, please upload your poster to the IRF cloud at <https://cloud.irf.se/s/SaSYLtiTj4Lc4aB>. Choose the poster folder. In this way, online participants have a chance to see your poster. They may then start a poster discussion with you by e-mail.

Splinter meetings:

A basic idea of the joined LPMR and EISCAT meeting is to provide plenty of time for discussions. This includes opportunities to hold splinter meetings. Please feel free to suggest such splinter meetings. A number of splinter meetings have already been suggested, and more information will be distributed during the conference.

Programme Overview

Sunday, August 14	
17:00-	Registration
18:30-	Dinner

Monday, August 15	
Lecture hall “Riddarsalen” and online	
9:00-9:20	Welcome, Logistics
9:20-10:30	Overview lectures
10:30-11:00	Coffee break
11:00-12:30	Novel facilities, models and analysis methods
12:30-13:30	Lunch
14:00-15:50	Observation systems connecting EISCAT and LPMR
15:50-16:20	Coffee break
16:20-18:10	Observation systems connecting EISCAT and LPMR
18:30-	Dinner

Tuesday, August 16			
Lecture Hall “Riddarsalen” and online		Lecture Hall “Lönnsalen”	
9:00-10:20	Variability and trends in the mesosphere	9:00-10:20	opportunity for splinter meetings
10:20-10:50	Coffee break	10:50-12:30	splinter meeting: EISCAT technical/software development
10:50-12:10	Variability and trends in the mesosphere		
12:30-13:30 Lunch			
14:00-15:30	Novel facilities, models and analysis methods	14:00-16:10	Observing dynamics in mesospheric layers
15:30-16:00	Coffee break	16:10-16:40	Coffee break
16:00-18:00	Novel facilities, models and analysis methods	16:40-18:00	Mesospheric composition and energy transfer processes
18:30- Dinner			

Wednesday, August 17

Lecture hall "Riddarsalen"
and online

9:00-10:20	Meteoric studies
10:20-10:50	Coffee break
10:50-12:00	Meteoric studies

12:30-13:30	Lunch
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14:00-16:00	Poster session, including coffee
16:00-17:30	PMSE and PMWE
17:30-18:00	Programmatic discussion

18:30-	Dinner
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Thursday, August 18			
Lecture Hall “Riddarsalen” and online		Lecture Hall “Lönnsalen”	
9:00-10:30	Ionospheric Variability	9:00-12:30	opportunity for splinter meetings
10:30-11:00	Coffee break		
11:00-12:20	Ionospheric Variability		
12:30-13:30 Lunch			
13:30-14:10	splinter meeting: Future plans for Optical Meetings	13:30-15:30	opportunity for splinter meetings
14:10-14:50	splinter meeting: The future of ISR on Svalbard		
14:50-15:30	splinter meeting: The future of heating		
16:00-19:30 Boat excursion, including dinner			

Friday, August 19	
Lecture hall “Amiralen” and online	
9:00-10:30	Auroral electrodynamics and Joule heating
10:30-10:50	Coffee break
10:50-12:30	Auroral electrodynamics and Joule heating
12:30-13:30	Lunch

Detailed schedule

Monday

9:00-9:20 **Buchert, Gumbel:** Welcome, Logistics

Session: **Overview Lectures**
(chair: Jörg Gumbel)

9:20-9:55 **Randall (invited),** Layered Phenomena in the Mesopause Region

9:55-10:30 **Heinselman (invited),** EISCAT and EISCAT_3D

Coffee break

Session: **Novel Facilities, Models and Analysis Methods**
(chair: Stephan Buchert)

11:00-11:30 **Varney et al. (invited),** US Community Efforts for Future ISR Science

11:30-11:50 **Sato et al.,** Two-dimensional imaging of plasma density structures in auroral ionosphere

11:50-12:10 **Whiter et al.,** High resolution observations of neutral heating by auroral electrodynamics

12:10-12:30 **Oyama et al.,** SDI-3D project

Lunch

Session: **Observation Systems Connecting EISCAT and LPMR**
(chair: Johan Kero)

14:00-14:20 **Ulich et al.,** From the Ground up: Observatory Operations Supporting EISCAT_3D

14:20-14:50 **Stober et al. (invited),** Assessing small scale dynamics using multi-static meteor radar observations and 3DVAR tomographic retrievals

14:50-15:10 **Gumbel et al.,** The MATS satellite mission - gravity waves in the mesosphere and lower thermosphere

15:10-15:30 **Megner,** Towards a Fenno-Scandinavian Arctic natural laboratory for MLT research

15:30-15:50 **Narayanan et al.,** Overview of gravity waves in coexisting neutral and plasma fluids of the upper atmosphere

Coffee break

- 16:20-16:50 **Blix et al. (invited)**, The Grand Challenge Initiative – CUSP and M/LT projects status and future plans
- 16:50-17:10 **Lehmacher et al.**, VortEx: A ground-based and rocket experiment to study mesoscale dynamics in the MLT for February 2023
- 17:10-17:30 **Vanhamäki et al.**, Observing mesospheric neutral wind with Electrojet Zeeman Imaging Explorer (EZIE)
- 17:30-17:50 **Dalin et al.**, A novel infrared imager at IRF for studying hydroxyl and oxygen emissions in the mesopause above northern Scandinavia
- 17:50-18:10 **Ivchenko et al.**, A UAV platform for optical observations of the upper atmosphere

Tuesday

Session: Variability and Trends in the Mesosphere

(chair: Gerd Baumgarten)

- 9:00-9:30 **Lübken et al. (invited)**, Past and future development of noctilucent clouds
- 9:30-10:00 **DeLand (invited)**, 43 Years of SBUV PMC Data: Trends, Solar Effects, and More
- 10:00-10:20 **Vellalassery et al.**, Solar cycle effect in water vapor and PMC as seen by satellites and model. What are the mechanism pathways?

Coffee break

- 10:50-11:10 **Thomas et al.**, Noctilucent Cloud Enhancements from Volcanic Eruptions: A test of the Krakatoa Hypothesis from the Hunga Tonga-Hunga Ha'apai Volcano
- 11:10-11:30 **Verronen et al.**, Long-term studies of the D-region ionosphere using the Whole Atmosphere Community Climate Model
- 11:30-11:50 **Kero**, Sensitivity of middle-atmospheric chemistry to energetic particle precipitation
- 11:50-12:10 **Nozawa et al.**, A statistical study of static and dynamic instabilities in the upper mesosphere region above Tromsø
- Poster **Moffat-Griffin et al.**, MesoS2D: Mesospheric sub-seasonal to decadal predictability
- Poster **Merkel et al.**, Investigating the influence of solar cycle, greenhouse gases and volcanoes on decadal variability in the polar summer mesosphere

Splinter Meeting

10:50-12:30 **EISCAT technical/software development** (chair: tbd)

Lunch

Session: **Novel Facilities, Models and Analysis Methods**
(chair: Lisa Baddeley)

14:00-14:30 **Ogawa et al. (invited)**, Possible common program (CP) modes for EISCAT_3D

14:30-14:50 **Hatch et al.**, Generation of a synthetic EISCAT_3D dataset

14:50-15:10 **Sergienko et al.**, Rocket experiment support with the EISCAT UHF radar

15:10-15:30 **Gustavsson**, Improvements to the ELSPEC method

Coffee break

16:00-16:20 **Virtanen et al.**, F1 region ion composition fits and auroral electron precipitation energy spectra fits with ion chemistry modeling

16:20-16:40 **Mekuriaw et al.**, Comparison of F-region ion velocities measured by the Swarm satellites and EISCAT radar

16:40-17:00 **Leyser**, On exponential frequency spectra and deterministic chaos in localized plasma wave interactions pumped by powerful radio waves in the ionosphere

17:00-17:20 **Spicher et al.**, Multi-instrument multi-scale characterization of ionospheric irregularities in the cusp region

17:20-17:40 **Hussey et al.**, ICEBEAR-3D: A New High-resolution VHF Coherent E-region radar

17:40-18:00 **Goertz et al.**, A new model for ionospheric absorption of HF waves due to protons

Poster **Cai et al.**, GeospaceLab: A Python package for data analysis in space physics and its application for incoherent scatter radar measurements

Poster **Reidy et al.**, Preliminary analysis of low altitude electron density measurements from EISCAT: a focus on data handling and occurrence

Poster **Häggström et al.**, PITHIA-NRF offer access to European upper atmosphere research facilities

Poster **Mihalikova**, Designing and developing services for End Users

Poster **Huyghebaert et al.**, EISCAT 3D Norway - An Overview

Session: Observing Dynamics in Mesospheric Layers

(chair: Scott Bailey)

- 14:00-14:20 **Baumgarten et al.**, Noctilucent clouds and their use as tracers on multiple scales: From turbulence to trends
- 14:20-14:50 **Kaifler et al. (invited)**, Instability dynamics in the MLT region observed by lidar and camera
- 14:50-15:10 **Hartisch et al.**, Observations of kilometer-scale instabilities using PMSE as tracers: A case study of varicose mode events
- 15:10-15:30 **Harvey et al.**, CIPS observations of gravity waves at the edge of the polar vortices
- 15:30-15:50 **Ramachandran et al.**, Investigation of Kilometre-Scale Instabilities using Airglow Imagers and Numerical Simulations: A Case Study of a Dissipating Bore
- 15:50-16:10 **DeLand**, Improved PMC Detection from OMPS Limb Profiler Measurements
- Poster **Linder et al.**, MATS Satellite Data: How Well Can We Determine Gravity Wave Parameters?
- Poster **Kaifler et al.**, Noctilucent clouds above a southern-hemisphere mid-latitude site

Coffee break

Session: Mesospheric Composition and Energy Transfer Processes

(chair: Jonas Hedin)

- 16:40-17:00 **Bailey et al.**, Nitric Oxide in the Polar Winter Observed by the Sub-Millimeter Radiometer (SMR)
- 17:00-17:20 **Grygalashvyly et al.**, The revised method for retrieving daytime distributions of atomic oxygen and odd-hydrogens in the mesopause region: The evaluation of the importance of the reaction $\text{H} + \text{O}_3 \rightarrow \text{O}_2 + \text{OH}$ in the ozone balance
- 17:20-17:40 **Kalogerakis et al.**, Studies of the OH Meinel and CO_2 4.3- μm Emissions in Planetary Atmospheres
- 17:40-18:00 **Li et al.**, O_2 and OH airglow in the mesosphere through the lens of Odin/OSIRIS Infrared Imager
- Poster **Kutepov et al.**, $\text{CO}_2 + \text{O}$ Collisions: A Grand Challenge for Upper Atmospheric Science

Wednesday

Session: Meteoric Studies

(chair: Linda Megner)

- 9:00-9:30 **Plane et al. (invited)**, Cosmic Dust in the Terrestrial Atmosphere
- 9:30-10:00 **Hervig et al. (invited)**, Long-term observations of meteoric influx from SOFIE, Wind, and Ulysses
- 10:00-10:20 **Feng et al.**, The self-consistent global atmosphere model of meteoric metals in Community Earth System Model (CESM2-metals)

Coffee break

- 10:50-11:10 **Kero et al.**, EISCAT 3D Science Outlook for Small Bodies in Geospace: 1 – Meteors
- 11:10-11:30 **Kastinen et al.**, EISCAT 3D Science Outlook for Small Bodies in Geospace: 2 – Meteoroids, NEOs and Space debris
- 11:30-12:00 **Mann (invited)**, The properties and interactions of dust in the mesosphere and its possible observational studies
- Poster **Mann et al.**, Investigating mesospheric dust with the MXD2 rocket campaign
- Poster **Lamy**, MLT parameters derived with the radio forward scatter network BRAMS : advantages and limitations
- Poster **Morroka et al.**, Dusty Plasma effect in Saturn's ionosphere

Lunch

Session: Posters

- 14:00-16:00 General poster session, including coffee

Session: PMSE and PMWE

(chair: Jörg Gumbel)

- 16:00-16:30 **Latteck et al. (invited)**, More than two decades of long-term observations of polar mesospheric echoes at 69°N
- 16:30-16:50 **Strelnikov et al.**, New results from rocket-borne measurements inside the polar mesosphere winter echoes

16:50-17:10	Murase et al. , Middle atmospheric ionization during substorms: 5-year observation of mesospheric echoes by the PANSY radar
17:10-17:30	Kozlovsky , Signatures of Pulsating Aurora in the Polar Mesosphere Summer Echoes
Poster	Mann et al. , Investigating Polar Mesospheric Echoes with EISCAT and Heating
Poster	Belova et al. , Infrasound as a Probable Cause of Fast-travelling Polar Mesosphere Winter Echoes
Session:	Programmatic Discussion
17:30-18:00	Discussions on future directions of EISCAT and LPMR meetings

Thursday

Session:	Ionospheric Variability (chair: Anita Aikio)
9:00-9:30	Kavanagh et al. (invited) , DRIIVE - DRivers and Impacts of Ionospheric Variability with EISCAT_3D
9:30-9:50	Bjoland et al. , Formation and IMF dependence of the early morning electron density depletion region observed in ESR data
9:50-10:10	Ellahouny et al. , Characteristics of F-region during an HSS/CIR-driven magnetic storm at the high-latitude ionosphere
10:10-10:30	Vierinen et al. , Ionospheric perturbations caused by the Tonga January 2022 volcanic eruption
	<i>Coffee break</i>
11:00-11:20	Koyama et al. , Response of the semidiurnal tide to the electron density to solar activity variation in the polar E-region using EISCAT UHF radar
11:20-11:40	Günzkofer et al. , Simultaneous AGW-TID detection with EISCAT and HF coherent scatter radars for retrieval of the neutral dynamics in the thermosphere using a dissipative anelastic GW dispersion relation
11:40-12:00	Sherstyukov , Investigation of medium-scale travelling ionospheric disturbances by dense GNSS-receivers' network and ionsonde
12:00-12:20	Cai et al. , Effect of polar cap patches on the neutral winds in the nightside high-latitude ionosphere

Poster	Eriksen et al. , Creation, Depletion and End of Life of Polar Cap Patches
Poster	Yamazaki et al. , Comparison of sporadic E from COSMIC-2 radio occultation and vertical wind shears from ICON/MIGHTI

Splinter Meetings

13:30-14:10	Future plans for Optical Meetings (chair: Daniel Whiter)
14:10-14:50	The future of ISR on Svalbard (chair: Lisa Baddeley)
14:50-15:30	The future of heating (chair: tbd)

Friday

Session:	Auroral Electrodynamics and Joule Heating (chair: Nickolay Ivchenko)
9:00-9:30	Zettergren et al. (invited) , Modeling the High-latitude Ionosphere Using Local-scale Simulations Driven with Incoherent Scatter Radar Data
9:30-9:50	Laundal et al. , Local mapping of polar ionospheric electrodynamics
9:50-10:10	Baloukidis et al. , A comparative assessment of the distribution of Joule heating as estimated by EISCAT and TIEGCM over one solar cycle
10:10-10:30	Krcelic et al. , Local Joule heating profile near small scale auroral features estimated using high resolution electric fields measurements
	<i>Coffee break</i>
10:50-11:10	Wang et al. , Ionospheric conductances due to electron and ion precipitations: A comparison between EISCAT and DMSP estimates
11:10-11:30	Tesfaw et al. , Characteristics of auroral electron precipitation at geomagnetic latitude 67 over Tromsø
11:30-11:50	Fukizawa et al. , Reconstruction of precipitating electrons and three-dimensional structure of a pulsating auroral patch from monochromatic auroral images obtained from multiple observation points
11:50-12:10	Dayton-Oxland et al. , Looking for signs of EMIC acceleration in proton aurora
12:10-12:30	Kvammen et al. , Auroral Image Classification with Deep Neural Networks

- Poster **Goertz et al.**, The Morphology of Poleward Moving Auroral Forms (PMAFs)
- Poster **Buchert**, Joule Heating and the Atmospheric Dynamo
- Poster **Ito et al.**, Simultaneous conjugate observations of the energy of pulsating auroral electrons by Arase satellite, EMCCD all-sky imager and EISCAT radar