THE ELECTRO MAGNETIC SPECTRUM

<table>
<thead>
<tr>
<th>Wavelength (metres)</th>
<th>Radio</th>
<th>Microwave</th>
<th>Infrared</th>
<th>Visible</th>
<th>Ultraviolet</th>
<th>X-Ray</th>
<th>Gamma Ray</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$10^3$</td>
<td>$10^{-2}$</td>
<td>$10^{-5}$</td>
<td>$10^{-6}$</td>
<td>$10^{-8}$</td>
<td>$10^{-10}$</td>
<td>$10^{-12}$</td>
</tr>
</tbody>
</table>

**Frequency (Hz)**

- Radio: $10^4$
- Microwave: $10^8$
- Infrared: $10^{12}$
- Visible: $10^{15}$
- Ultraviolet: $10^{16}$
- X-Ray: $10^{18}$
- Gamma Ray: $10^{20}$
ELECTROMAGNETIC SPECTRUM

range of broad and discrete wavelengths (nanometers) as measured by UVMRP instruments

Infrared ~ 700  Visible Region  ~ 400  Ultraviolet  ~ 290

UV-MFRSR at 2 nm FWHM

940  870  673  615  1040-300 (open channel)  500  415

vis-MFRSR at 10 nm FWHM

UVB-1 pyranometer broadband 320 - 280

PAR quantum sensor broadband 700-400

UV-A biometer broadband 320-290

downward photometer (albedo) sensor broadband 1100-400
The Electromagnetic Spectrum

- Gamma ray
- X-ray
- Ultraviolet
- Visible
- Infrared
- Microwave
- Radio
Absorption and Emission Spectra of the Elements
AURORA BOREALIS
AURORA AUSTRALIS
Northern Lights
Southern Lights
Anaheim Ballet Music
Aurora borealis seen from Maine’s Acadia National Park
Photograph by Michael Melford

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