

Planetary Association for Clean Energy

USPA Webinar

August 28, 2021

**What you should know
about the coming *5G* and
*what to do about it***

Andrew Michrowski

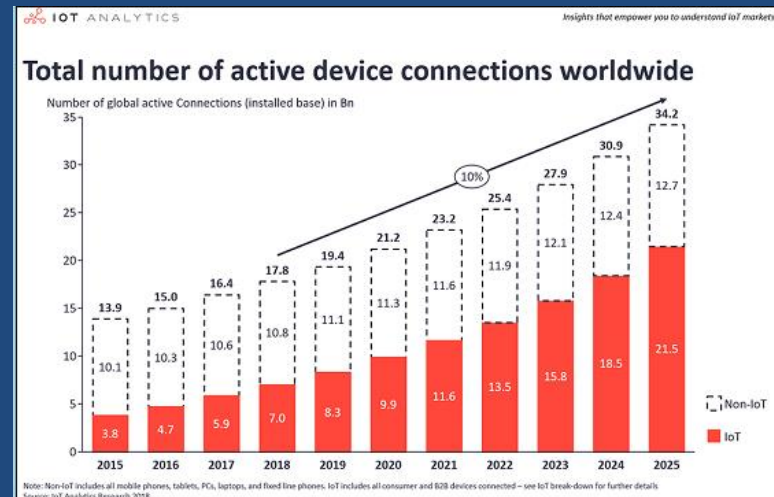
What you should know about the coming 5G – and what to do about it

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Our background microwave hash

Comparing *light* and *microwave* emissions (from smart meters, Wi-Fi, cellphones). With 5G, this hash may increase another 100X or more.



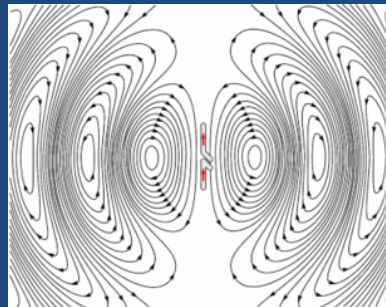
Internet of Things will use microwaves than people as of 2021

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Man-made *signalling* is **POLARIZED.**
NEW to living systems



Natural *emissions* are **NON-**
POLARIZED

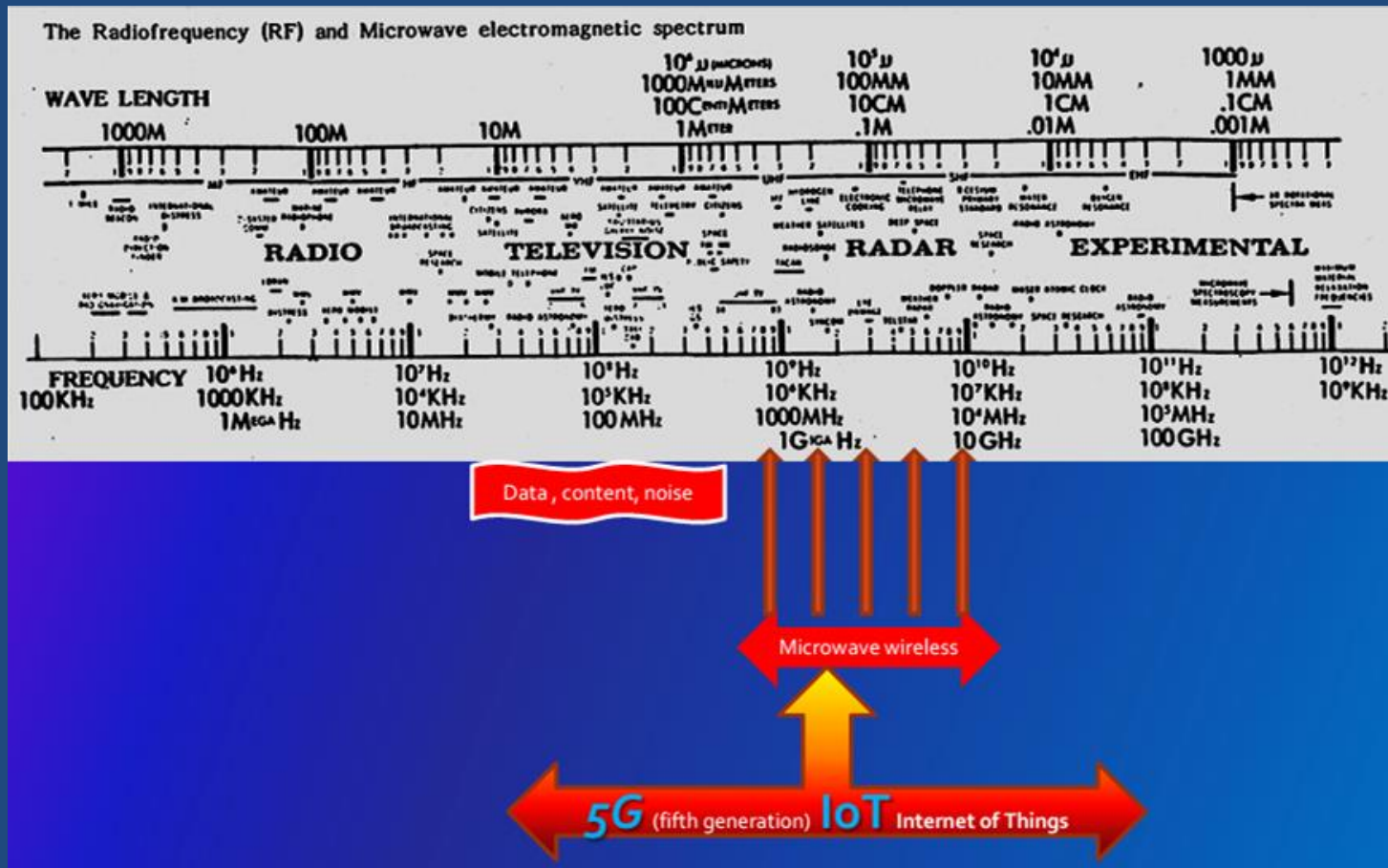
Adapted by living systems

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Interoperability of bandwidths – 5G and their adverse bioeffects windows



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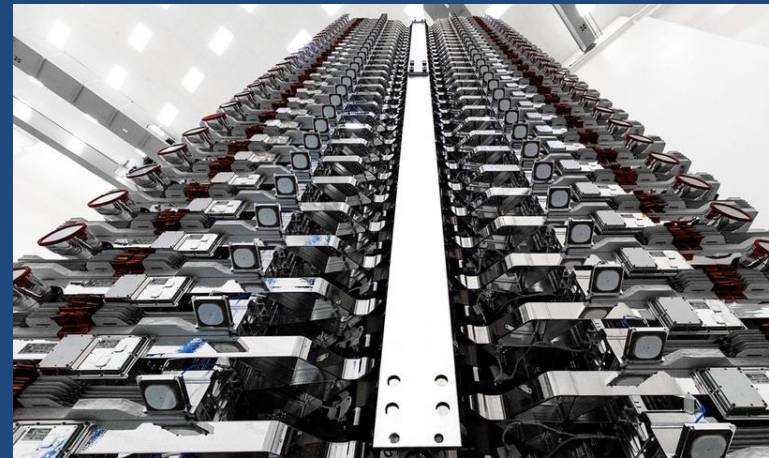
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5G's 60,000 satellites

42,000 from **SpaceEx**, planned in low & medium orbits, focusing & steering microwaves up to 5,000.000 Watts from phase-array antennas.

Located in Magnetosphere - therefore of significant influence over atmosphere's electrical properties.

Modification of Earth's electromagnetic environment may be an even greater threat to life than radiation from ground-based antennas.



SpaceX Starlink
Satellites ready for launch

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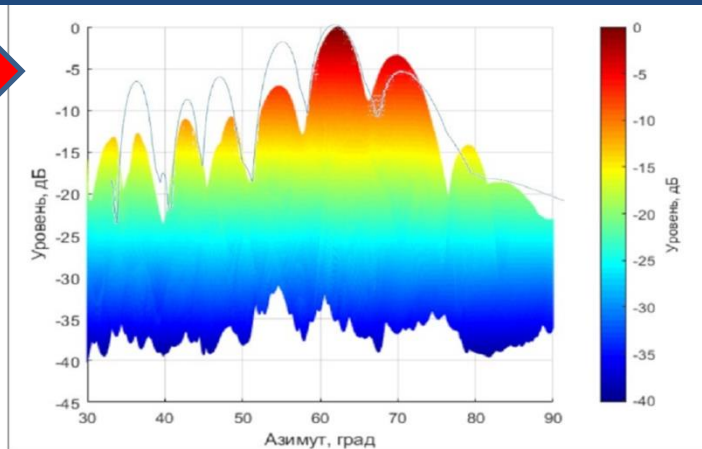
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5G trials & actual emissions differ in their effects on the atmosphere

red coloured levels constitute excess of real signal density over that projected from trials

interfeerence



Legend - left: Level, dB / bottom: Azimuth, degrees / right: Level, dB

World Radiocommunication Conference (WRC-19) Sharm el-Sheikh, Egypt, 28 Oct – 22 Nov 2019 – submission from the Russian Federation

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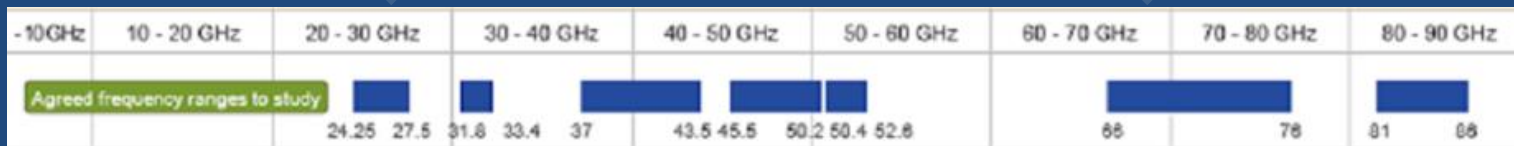
The additional 5G's multiple bands –

New, un-assessed environmental effects on water & Oxygen

**Water
resonance**



**Oxygen
resonance**



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5G's effects on weather monitoring

“... accuracy of [weather] data collected may only become apparent in few years ... **if interference occurs, it will be irreversible.**”

World Radiocommunication Conference (WRC-19) Sharm el-Sheikh, Egypt, 28 Oct – 22 Nov 2019

World Meteorological Organization (WMO) submission

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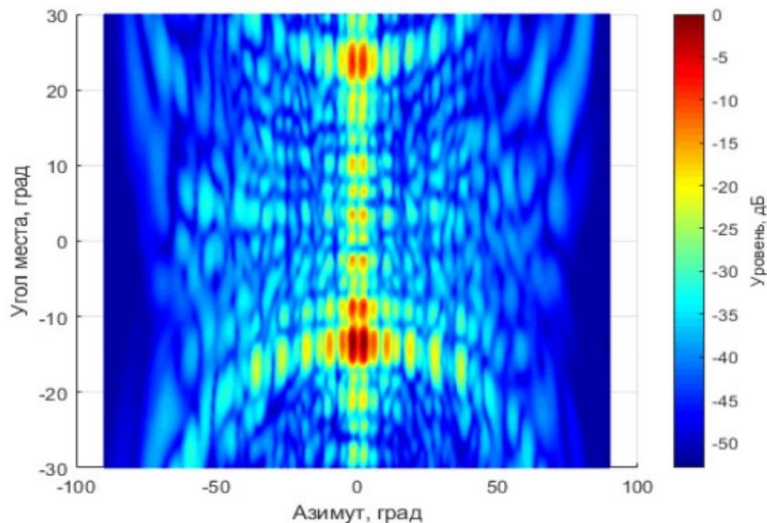
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5G infrastructure microwave hash - satellites

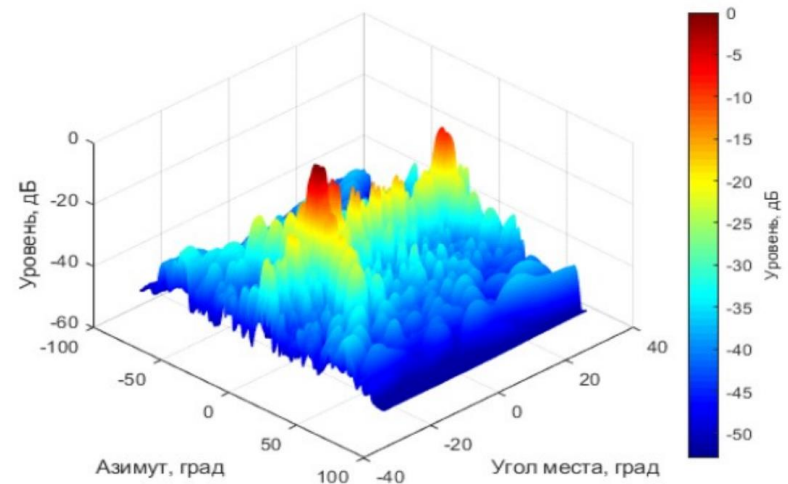
Multibeam “talk” patterns between “things” worldwide

3-D dimensional spatial patterns with potential for multi-dimensional interfaces of unknown significance to life

Radiation pattern in a Cartesian coordinate system (RAKURS 1)



Radiation pattern in a Cartesian coordinate system (RAKURS 2)



Legend - left: Elevation angle, degrees / bottom left: Azimuth, degrees / right: Level, dB / right: Level, dB

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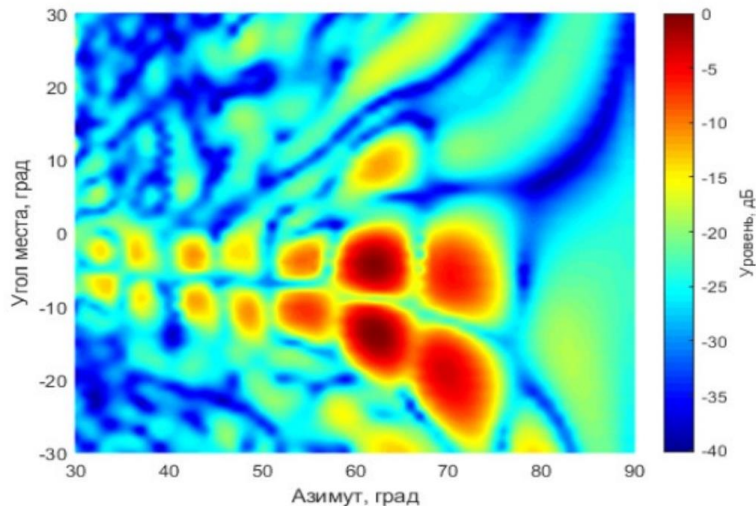
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5G infrastructure microwave hash - antennae

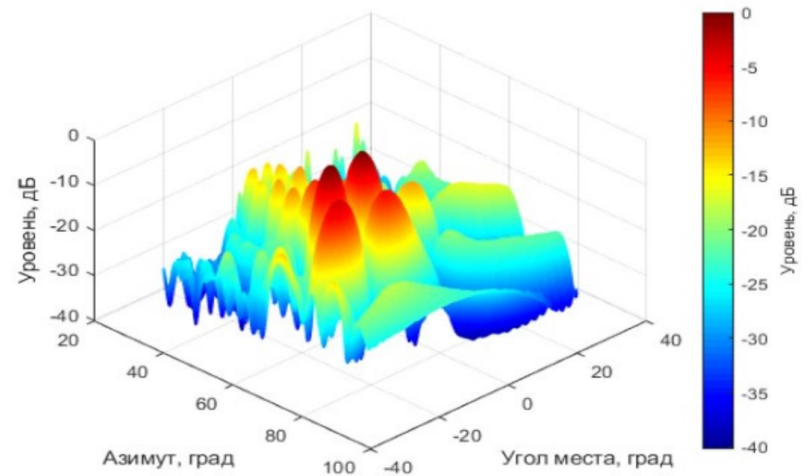
Multibeam “talk” patterns between “things” worldwide

Antenna radiation pattern in a Cartesian coordinate system (RAKURS 1)



Legend - left: Elevation angle, degrees / bottom: Azimuth, degrees / right: Level, dB

Antenna radiation pattern in a Cartesian coordinate system (RAKURS 2)



Legend - left: Level, dB / bottom left: Azimuth, degrees / bottom right: Elevation angle, degrees / right: Level, dB

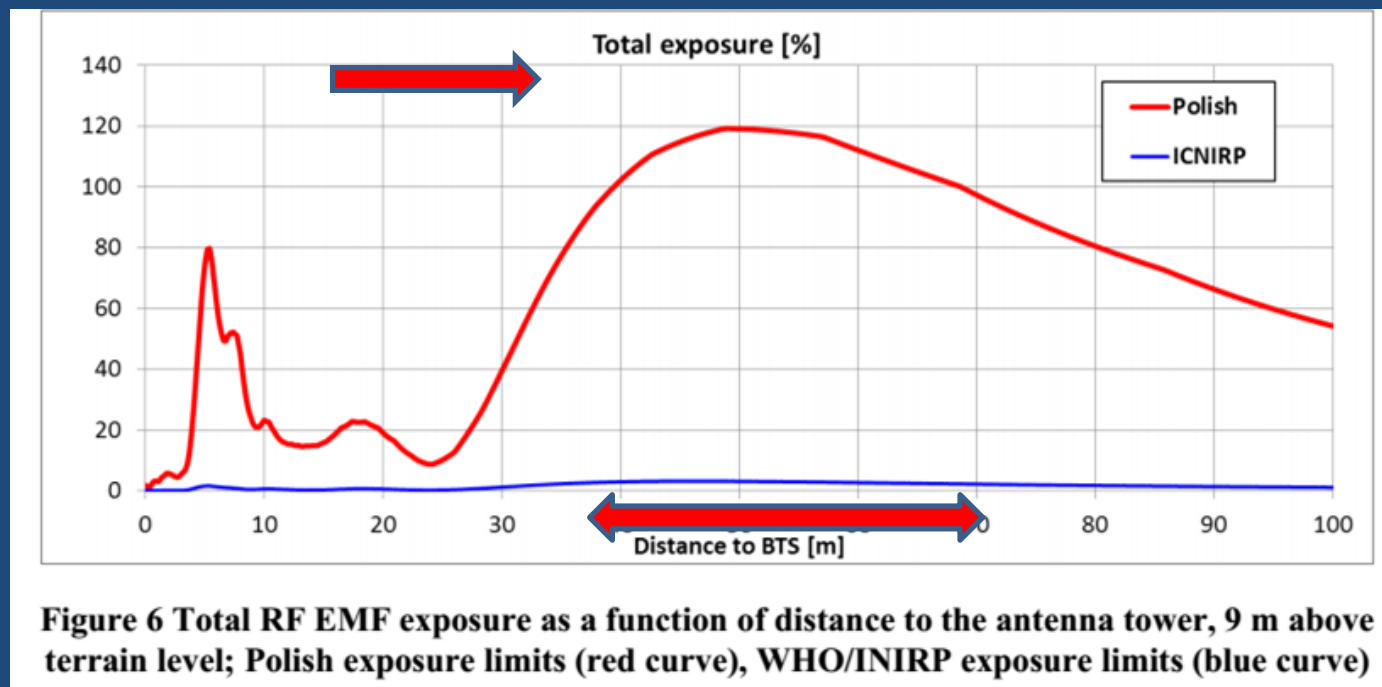
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5G emissions exceed national exposure standards

Case of Poland (below). Elsewhere, standards are being lowered to permit technological feasibility - beyond body heating levels



Submission to United Nations ITU (standardisation sector) September 2019 from Orange Polska

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5G exposure context

U.S. FCC rules permit 5G base station beams effective radiated power at 30,000 Watt per each 100 MHz of spectrum.

This allows 300,000 Watt / GHz of spectrum, or 1000 times more powerful than 2019 uses.

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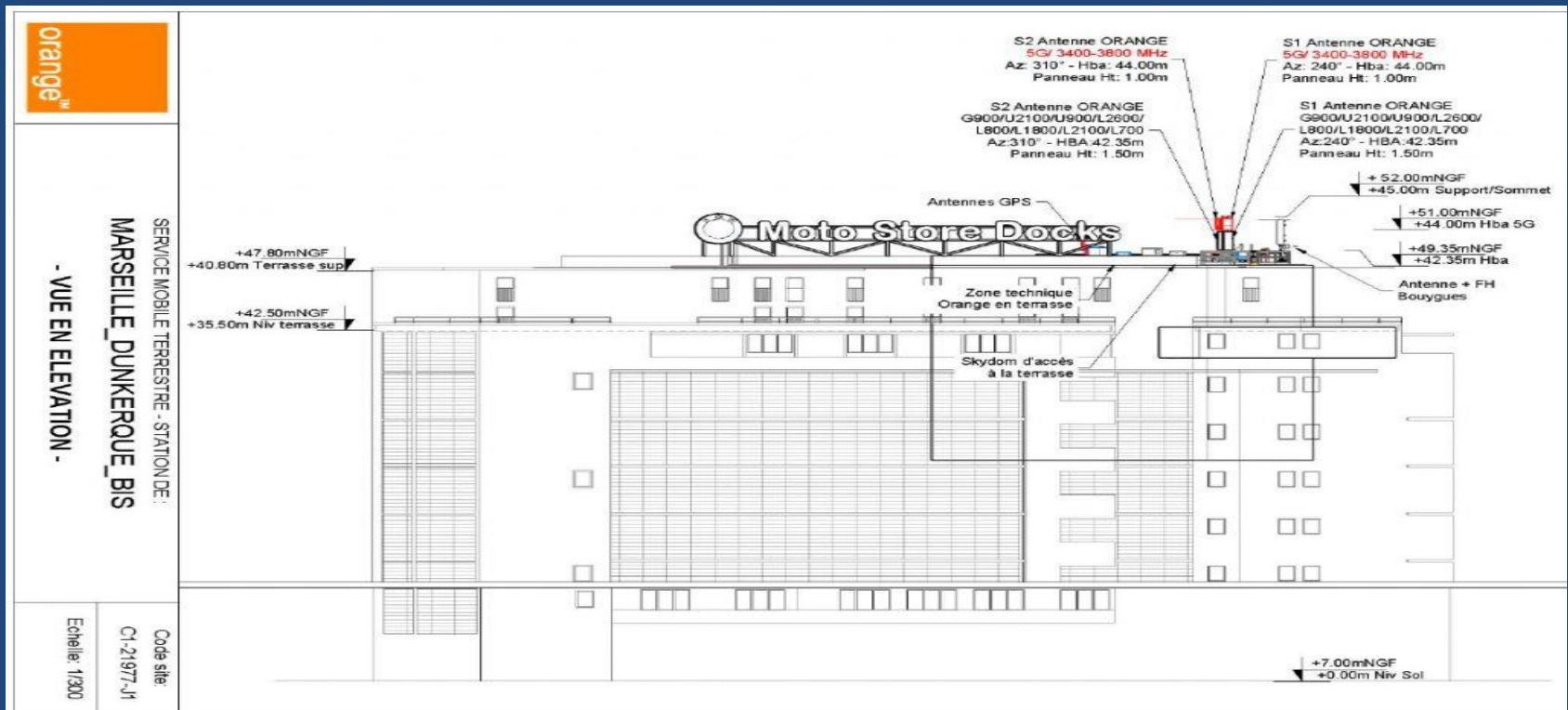
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Microwave band - wireless technologies - increasing intensity

2019 roof-top transceivers Swiss analysis :

Total emissions from 2G / 3G / 4G + 5G = **47,629 Watts**

5G emissions **double** sum of the all other transceivers. David Bruno



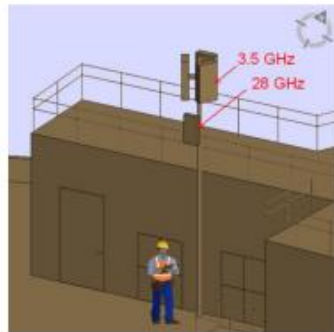
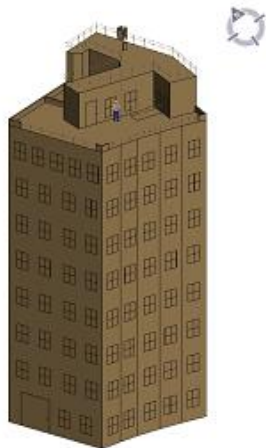
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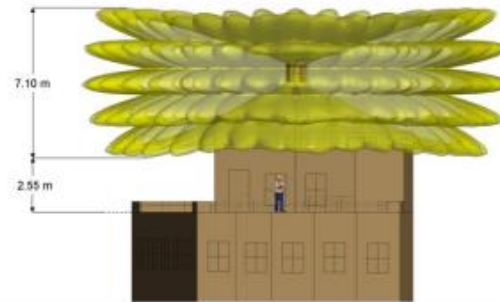
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Comparing current & 5G's MIMO

Example: 5G site with massive MIMO 3.5 GHz and 28 GHz, actual maximum power



5G urban roof-top installation



Exclusion zone
10 W/m²
ICNIRP general public limit



Actual maximum power = 25% of theoretical maximum
RF EMF exposure below ICNIRP limits in public areas
Case study to be included in IEC TR 62669 (2018) and
ITU-T Supplement on 5G EMF compliance

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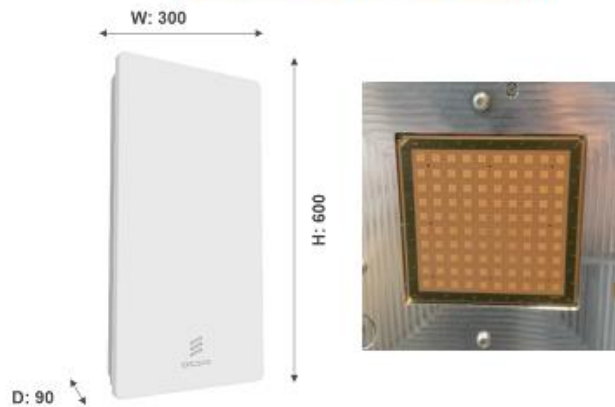
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5G's MIMO (Ericsson AIR 5121) – exceeds Polish standard

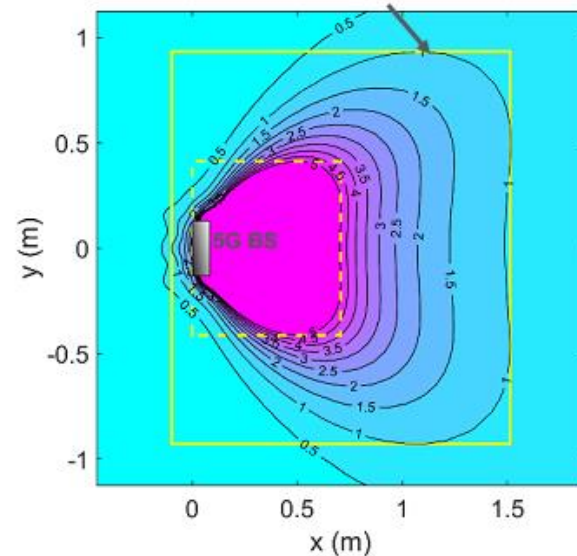
28 GHz 5G massive MIMO small cell



Ericsson AIR 5121
28 GHz
512 antenna elements
8 beams
< 1 W total output power
24 dBi antenna gain
Beam steering: $\pm 60^\circ$ (h), $\pm 15^\circ$ (v)



Exclusion zone, 10 W/m²
(ICNIRP power density limit for the general public)



Computation assuming maximum power in all beam directions, TDD taken into account

ICNIRP limit compliance not an issue for normal installations – although larger exclusion zone than for 3G/4G
10x larger exclusion zone with 1/100 of ICNIRP – installations may be challenging

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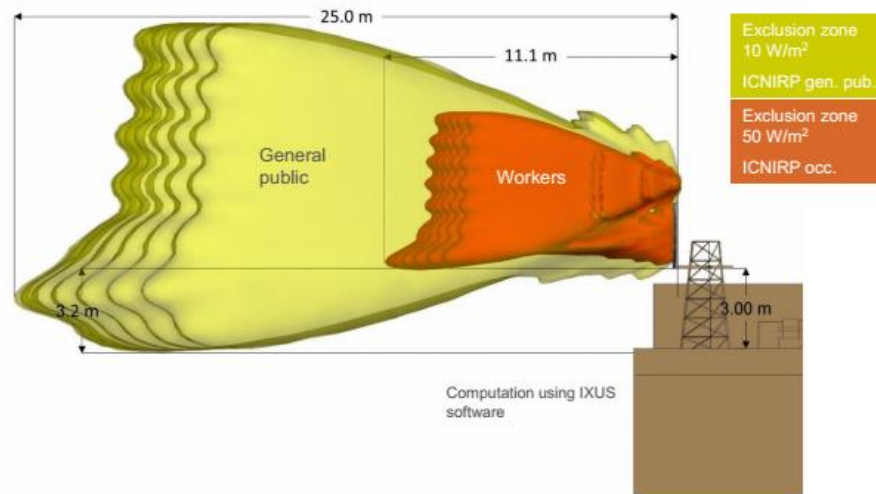
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5G's MIMO – where standards exceed up to 25 metres away

3.5 GHz 5G site with massive MIMO



- 3.5 GHz, 200 W
- Massive MIMO (64 elements)
- EIRP of 72 dBm
- Installation on existing site with 2G, 3G and 4G antennas
- Theoretical maximum power (100% simultaneous utilization) assumed for all antennas



Very large exclusion zone due to unrealistic power - may lead to substantial 5G deployment challenges
IEC 62232 (2017) and ITU-T K.100 standards open up for use of actual maximum output power (95th percentile)

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5G's MIMO – severe exposure zone: 115m X 70m



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5G's MIMO require downgrading standards

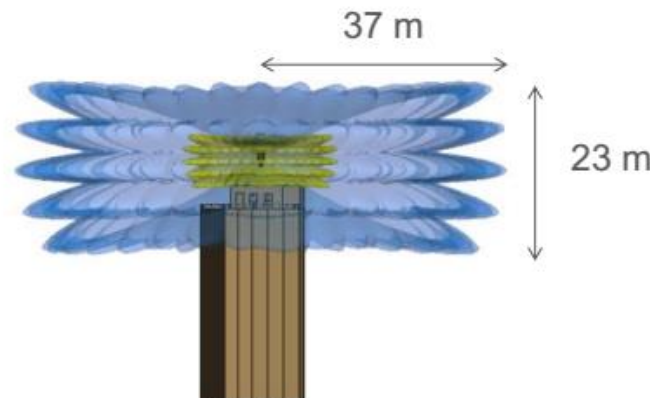
Impact of lower national EMF limits

1/10 of ICNIRP limit



5G site

3.5 GHz, three sectors
28 GHz, one sector
Actual maximum power



Exclusion zone 10 W/m ² ICNIRP limit
Exclusion zone 1 W/m ² 1/10 of ICNIRP limit

Size of exclusion zone
makes 5G network roll-out
very challenging

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5G's security issues

74% failure rate for hacking

affecting power grids, smart meters

cars, TVs , Alexas, etc.

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5G – world-wide Internet of Things (IOT) “smart grids”



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5G's deployment forecast

70% of 5G IoT to be outdoor surveillance cameras, connected cars. Government security

Eventually cars to become major user of 5G IoT (26 million by 2025)

Cellular V2X communications between vehicles, infrastructure, pedestrians, cyclists , including wearbles (electronics, sensors, software).

China's Huawei sees 480 million households worldwide with 5G access by 2025: executive

Gartner Inc.

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5G – so power density-intensive that exposure standards may have to be increased to ensure operational viability.

(Already so for FCC car rules at 2,200 X higher power at 3 metres away than European Council EMF guidelines (giving exposure of 220 $\mu\text{W}/\text{cm}^2$ for drivers)

Federal Register 2012/08/13/2012-19732

NATO is concerned about additional military communications and electronic warfare (COMMS & MIMO) vulnerability.

Brussels METIS 2020 meeting October 5-6, 2018

“Smart meters did not work; let’s avoid the same mistake with the Internet of Things.”

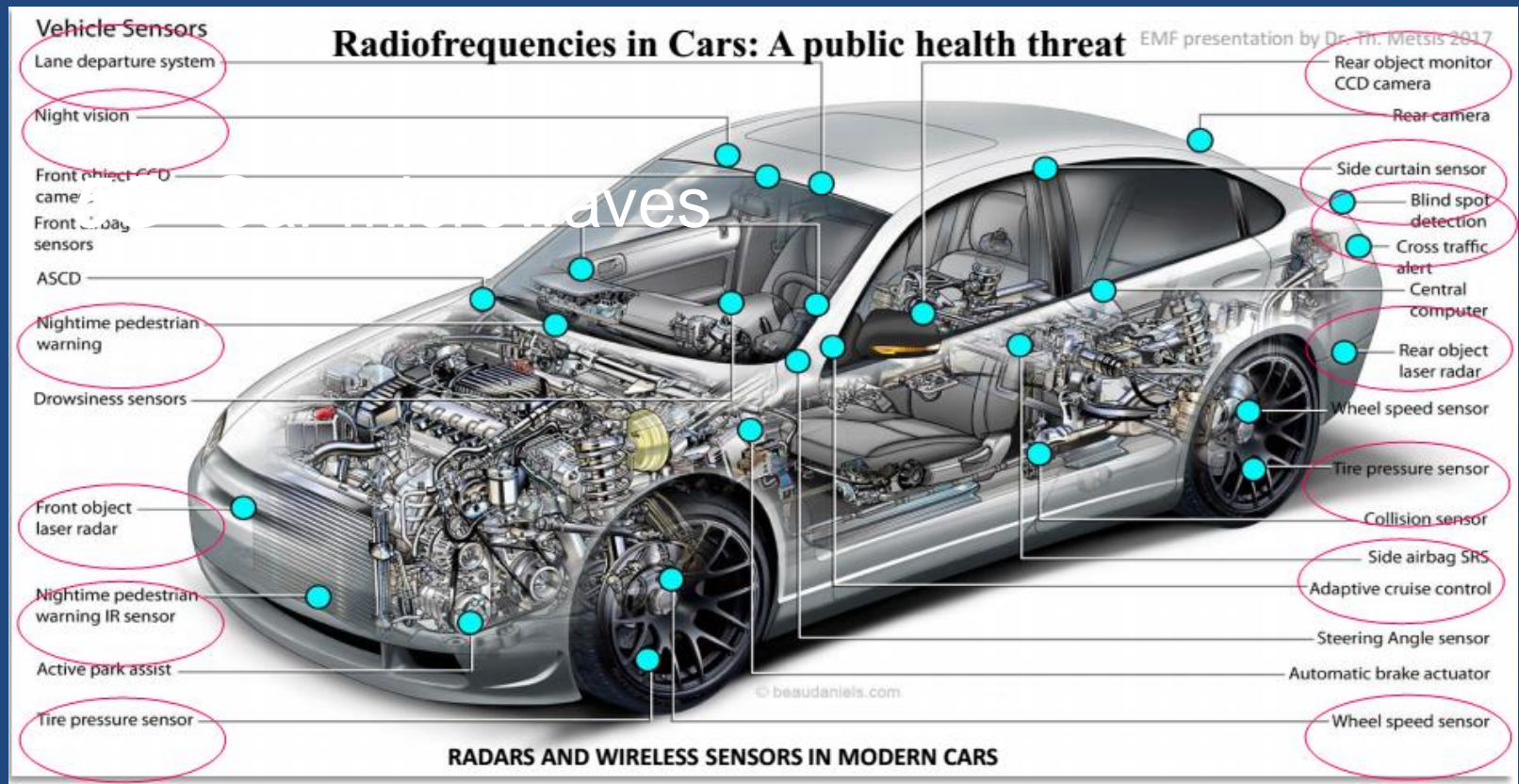
Seyi Fabode, Partner at Asha-Labs.com

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5G car emissions (~24 GHz and ~77 GHz)



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Microwave emissions associated with cars, including street-side

Frequency range (~ **24 GHz** and ~ **77 GHz**)

EMF from tires and other sources unique to hybrids

Microwaves from cellphone and those of passengers

Microwaves from **Bluetooth, Wi-Fi** hot spots, and from cell towers

Microwaves from radars of other cars

Microwaves from on-board radar sensors to detect motion and driver alertness

FCC Directive : *elevated radars exposure must continue even when cars idle* ;

With many cars at stop sign could results in exposure to those crossing a street to **over 100 X Safety Code 6** - especially **dangerous** for children.

after: Prof. Kostoff Georgia Tech,

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Relief with personal EMF-imprinting devices

Pulsor / Purple Plates / Aires

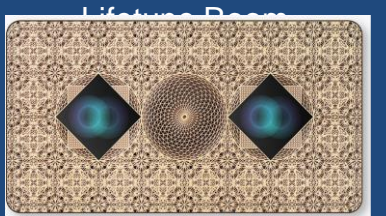
Possible Autonomic Nervous System (ANS) regulation & Heart Variability Rate (HRV) coherence as indicators of adaptability, tonus and harmonization.

Human brain recuperates from ELF and microwaves relief

Pulsor



Purple Plate

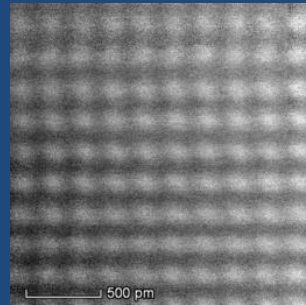


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How a *lattice* harmonizes *Polarization & ions*

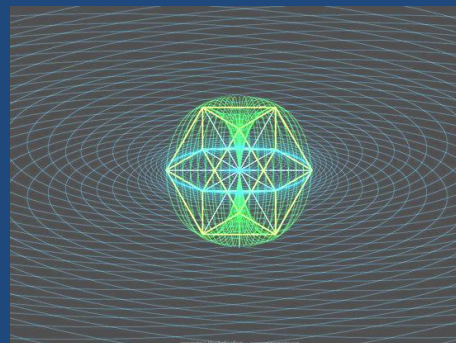


Crystalline structure of Aluminium observed with crystallography

Purple Plate



this coherence is amplified by restructuring all atoms with superposition of phasing **Tesla** coils



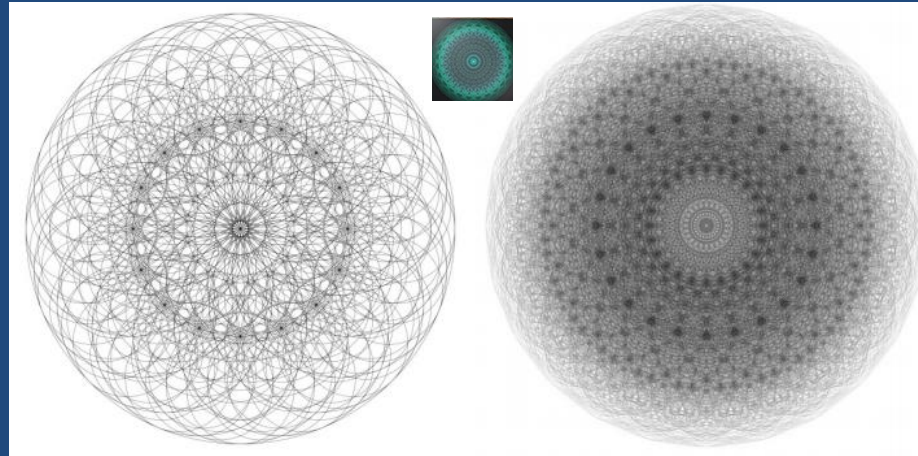
A perspective of incorporating crystalline, spiral, and standing wave interaction inducing coherence at near-fields

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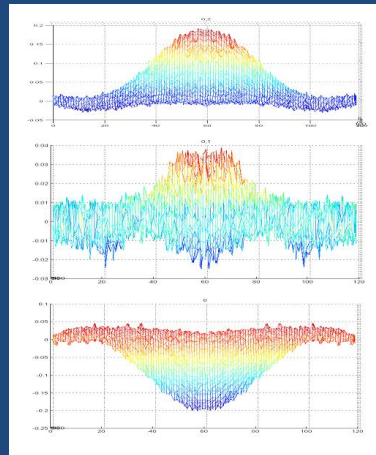
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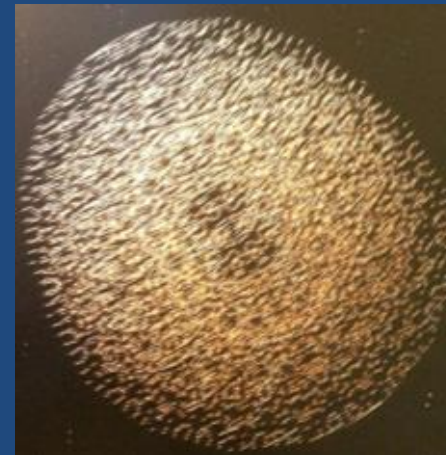
**How a
fractal
Self-affine
lattice
harmonizes
amplitude
phase
frequency
polarization
vectors
of external
EMF
emissions
(to 28 GHz)**



Aires lattice etched on surface



Electric field activated on lattice



Holographic response from incoherent EMF

Lifetune

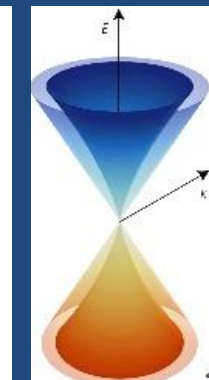
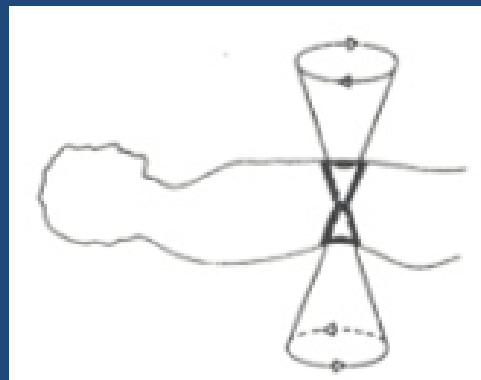
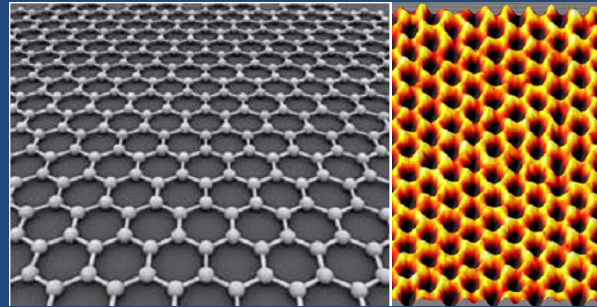
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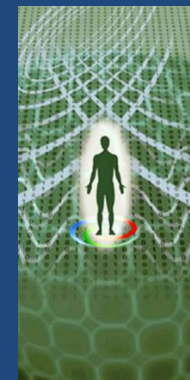
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How 3-D lattices carbon designs

can create
specific
amplitude
phase
frequency
polarization
charge
adsorption,
conductance
& vorticity



Dirac
cone



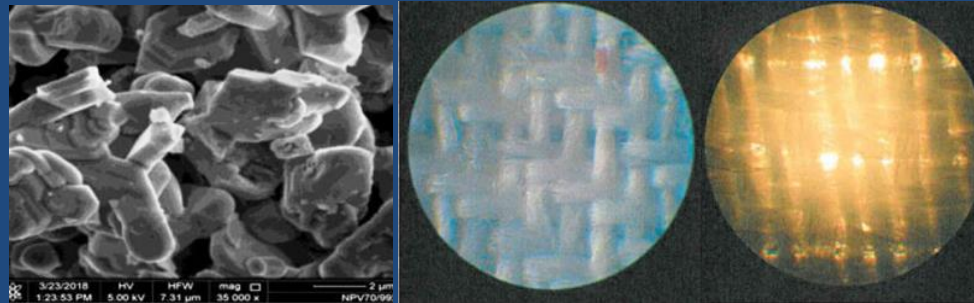
Pulsor technology

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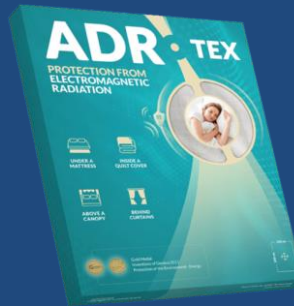
**Advanced
Materials
composite**



Micro image of **ADR** aggregate.

Microscopy
In reflection and
transmission
modes – Cr, Fe, Ni

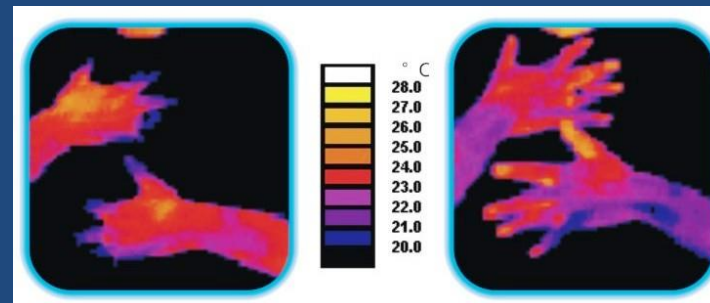
**Electric
field
shielding
&
Reflection**



TEX and
composite
pad

**Wiring &
5G**

**ADR
TEX
mats**



Thermographs
of before and after
contact with **ADR**