

PHILIPS

sense **and** simplicity

Simple monitoring of ultrafine particles

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Ultrafines – a ‘new’ type of hazardous air pollution

Ultrafine particles in urban air and respiratory health among adult asthmatics

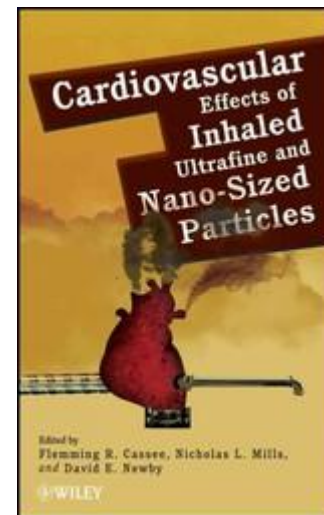
P. Penttinen*, K.L. Timonen*, P. Tiittanen*, A. Mirme[#], J. Ruuskanen[†], J. Pekkanen*

Respiratory Effects Are Associated with the Number of Ultrafine Particles

ANNETTE PETERS, H. ERICH WICHMANN, THOMAS TUCH, JOACHIM HEINRICH, and JOACHIM HEYDER

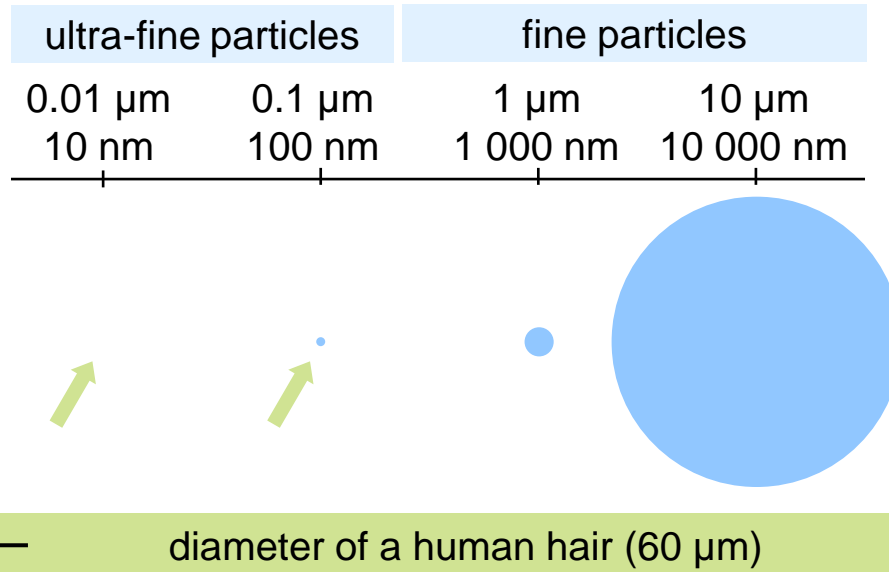
Exposure to diesel exhaust induces changes in EEG in human volunteers

Björn Crüts¹, Ludo van Etten¹, Håkan Törnqvist², Anders Blomberg², Thomas Sandström², Nicholas L Mills³ and Paul JA Borm^{*1}



The EU aims to begin **regulation** of ultrafine particles in **2013**, said Andre Zuber in a keynote speech on behalf of the **European Commission** at the EFCA symposium in Brussels on 27 May.

Ultrafines – a different type of air pollution

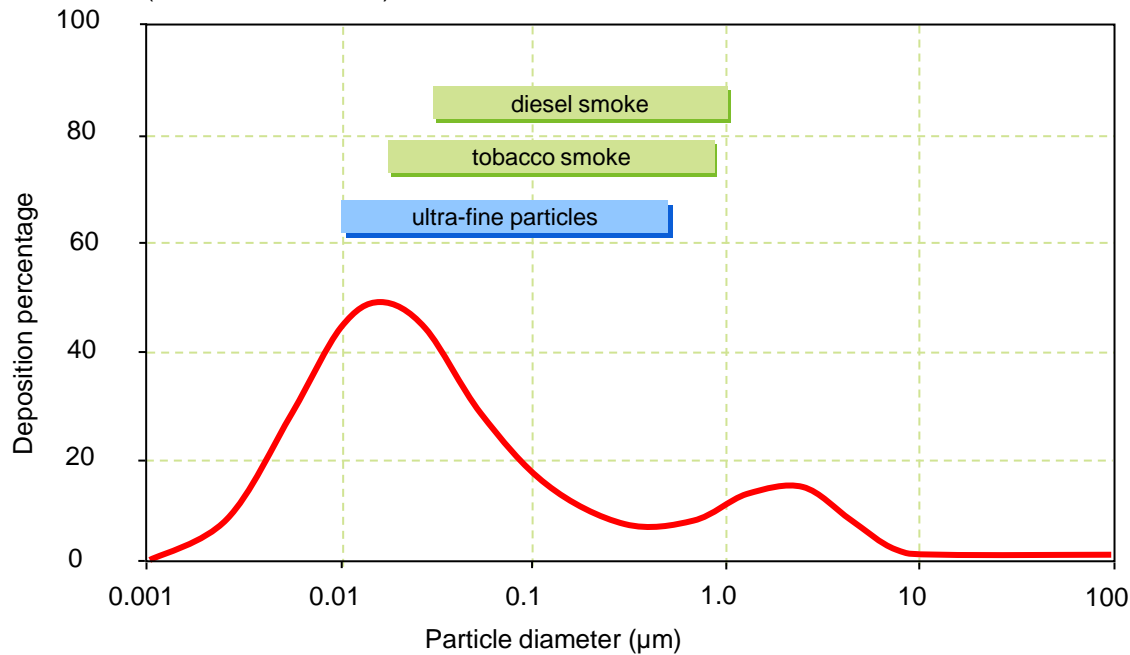


Inhalable particles:

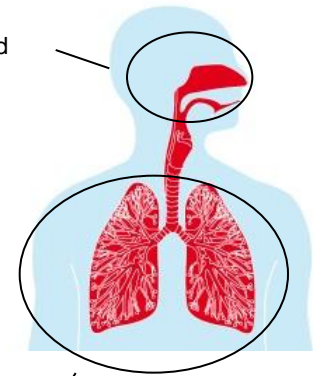
- PM10 < 10 μm
- PM2.5 < 2.5 μm
- ultrafine particles (UFP) 0.01 – 0.30 μm

Toxicology of ultrafines differs from PM10/2.5

Deposition of airborne particles in deep parts of the lungs (alveoli) as a function of their diameter
(source: ICRP, 1994)



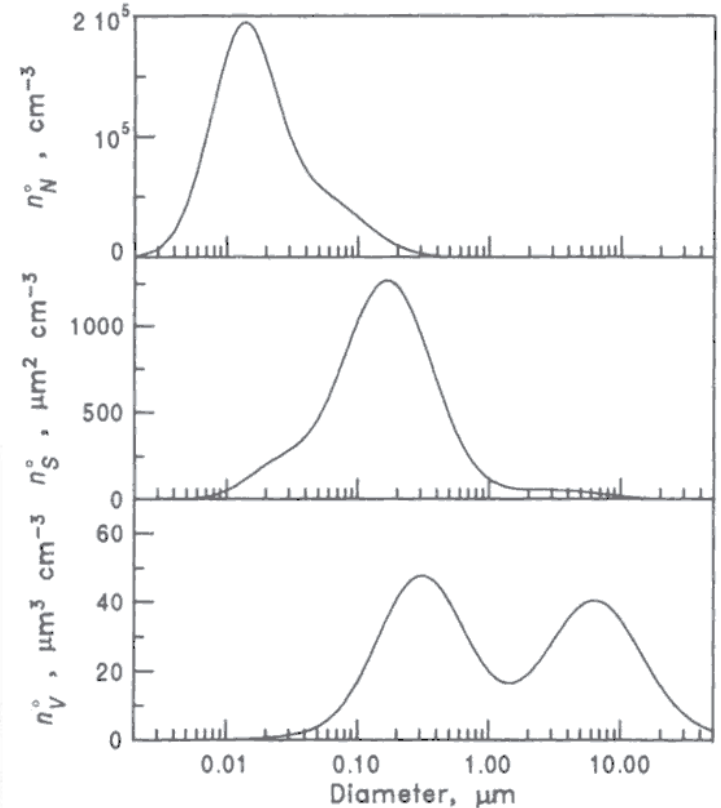
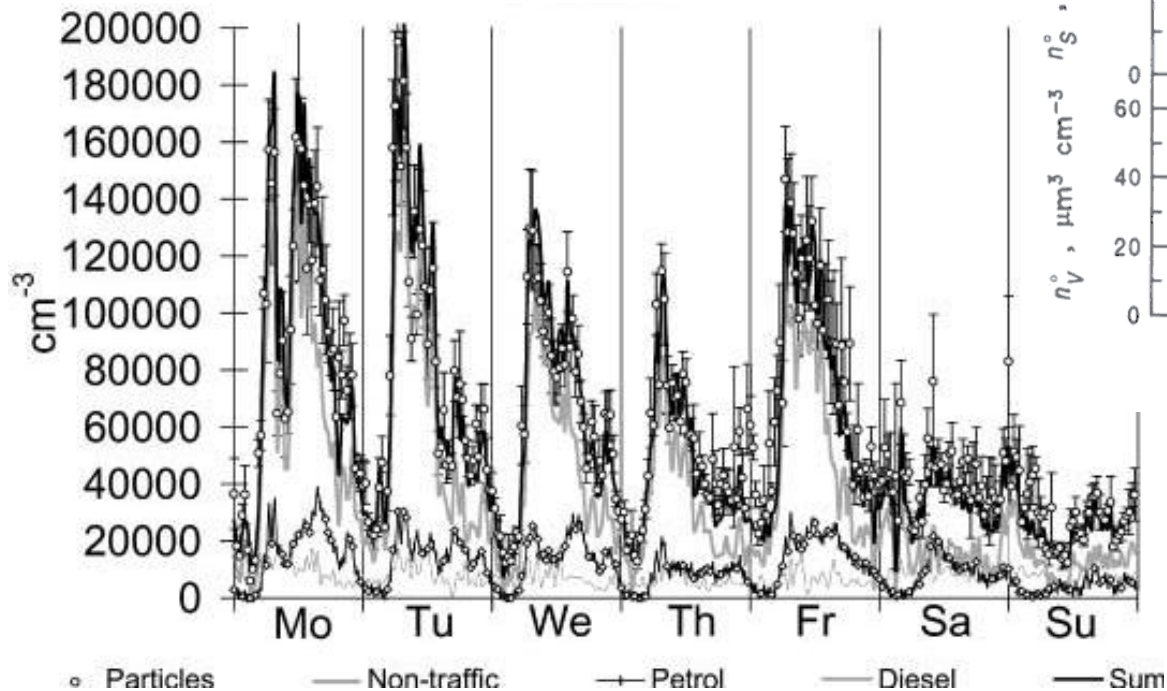
Coarse particles are caught in the nose and throat



Ultra-fine particles deposit deep in the lungs

Ultrafines need new monitoring equipment

- Number/surface instead of mass
- Small and simple equipment to check local, traffic related sources



Aerasense ultrafine monitoring technology

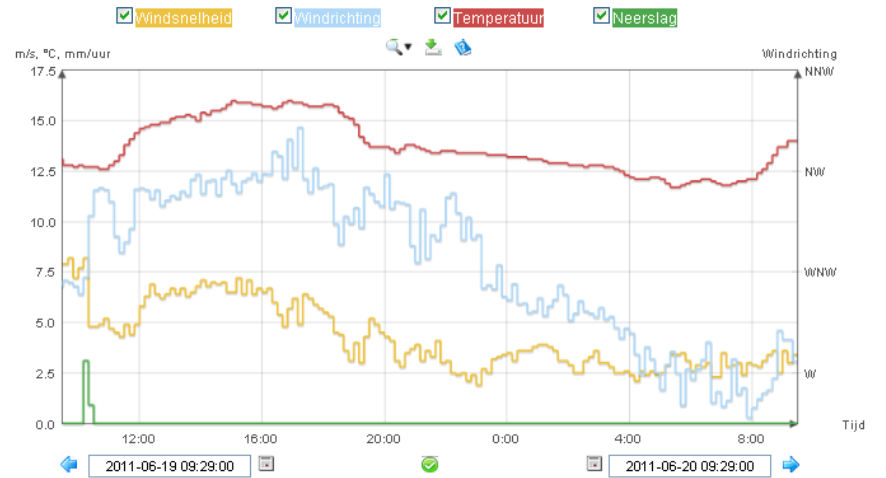
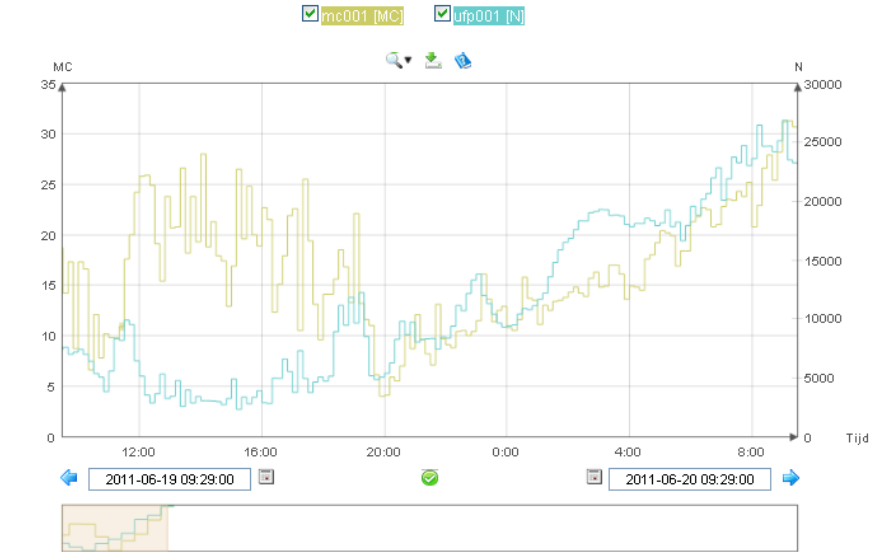
- Detects
 - number concentration
 - average diameterof ultra fine particles (10 – 300 nm)
- Infers surface area concentration
- Measures accurately and real-time
- Small and easy to use



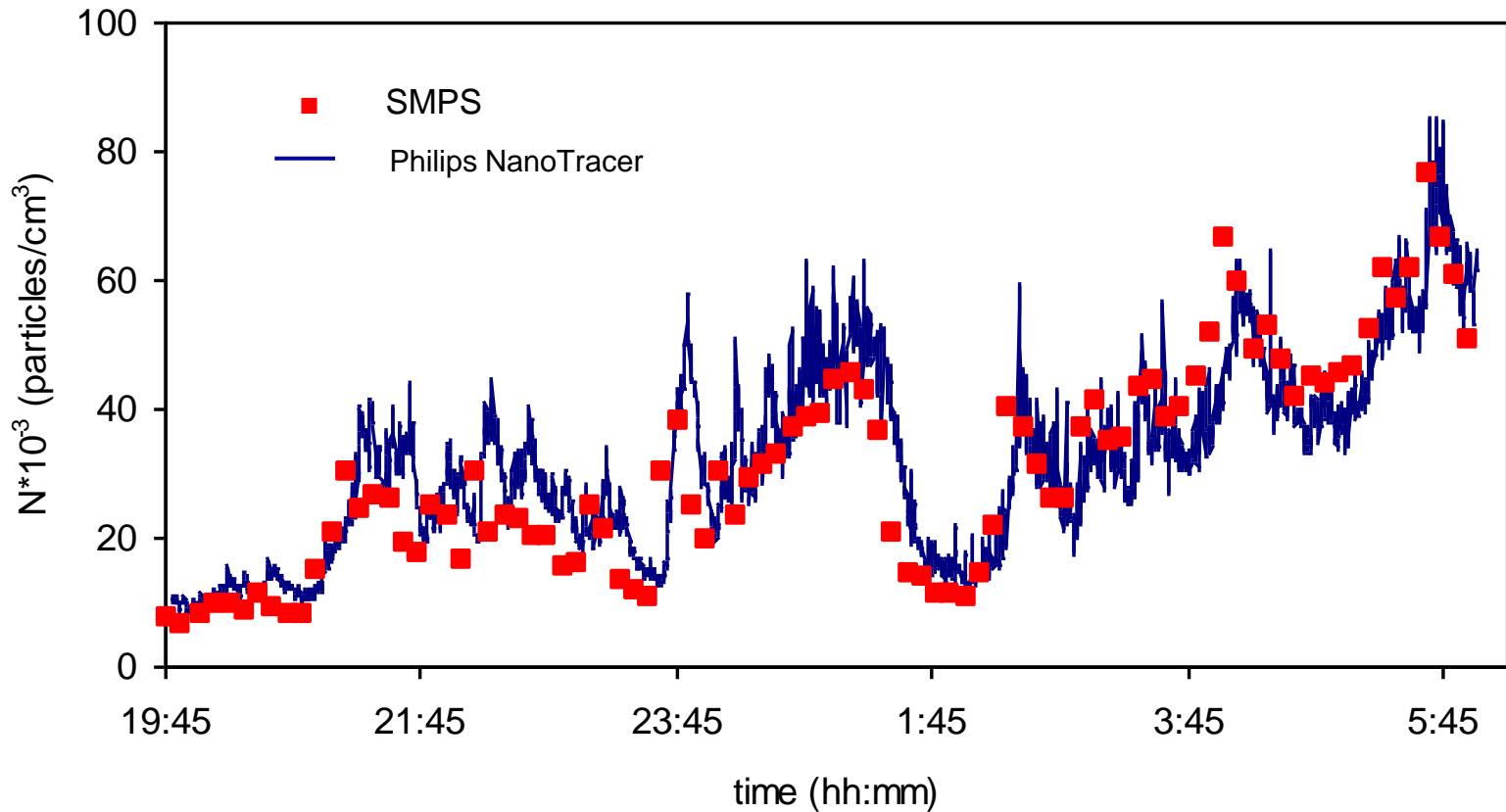
Simple application



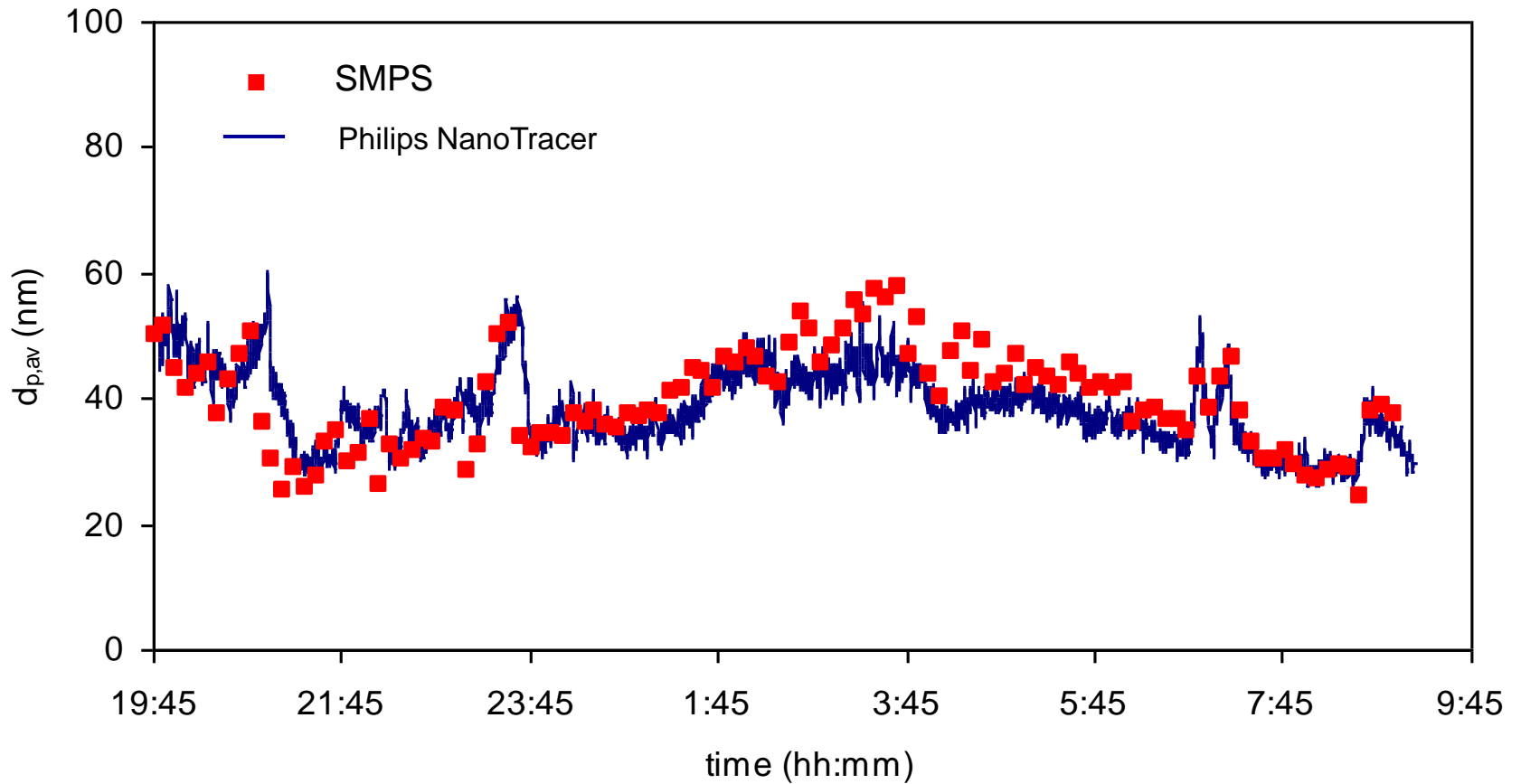
Ultra Fine Particles



Aerasense measures concentration levels accurately



Aerasense measures particle diameter accurately



Aerasense is an established technology for occupational exposure to ultrafines



Safe production and use of nanomaterials

Process or location	UFP concentration level (particles/cm ³)	Main particle size (nm)
outdoor, office	up to 10.000	
silicon melt	up to 100.000	280-520
metal grinding	up to 130.000	17-170
soldering	up to 400.000	36-64
plasma cutting	up to 500.000	120-180
bakery	up to 640.000	32-109
airport field	up to 700.000	< 40
welding	100.000 – 40.000.000	40-600



Average UFP exposure levels measured in a wide variety of work places as measured by the German workers health protection institute BGIA

Thank you



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Aerasense technology

