



The Physical World

Waves: an ocean of EM radiation

ANGELA: While we're at it a quick guide to wavelengths. Radio waves can be hundreds of metres or just metres. TV, well that's about a metre or so. Microwaves are only centimetres. And after that it all starts to get very, very small.

ANDREW: And at higher and higher frequencies, shorter and shorter wavelengths, we come to infrared radiation, heat and at shorter wavelength still, we get visible light. Light all around us is just electro-magnetic radiation with wavelengths of less than a millionth of a metre. And further on still we get ultraviolet light.

ANGELA: Yes, light is an electro-magnetic wave just like radio only with a fantastically shorter wavelength and it doesn't stop there. These are even shorter wavelengths and you get x-rays, even gamma rays – many names but still the same thing – electro-magnetic waves, an infinite spectrum of radiation, and that wavy electro-magnetic radiation is quite literally everywhere.

ANDREW: In fact the Universe contains about a billion times as much electro-magnetic radiation as it does matter. We tend to think in terms of material objects because we're made of atoms and molecules, but even in the empty vacuum of space there may be no matter, but it's full of electro-magnetic waves: starlight from the stars, the cosmic microwave background left over from the Big Bang, and in many ways the stars, planets and galaxies are just surrounded by a sea of electro-magnetic radiation, just as our two fishing boats are surrounded by a sea of water waves.

ANGELA: So there you have it, we're all surrounded by an ocean of waves, just for some of us it's more obvious than others, but even if you don't go out to sea, there's sound, light, heat, radio, television – we're all in contact with a universe of wave energy. The fishermen rely on that contact for their livelihoods and sometimes their lives.

LEWIS BUTTERS: Look the old man used to say look after your worst enemy out to sea 'cos you never know when you'll get in trouble yourself. Out to sea you've got to have somebody if you get in trouble, you know, it isn't like on the land – you can't get out of a boat and walk in.

TONY PAWLYN: At the end of the day, men going to sea will be alone there and then. At the moment you're there it's up to you how you cope with the situation. This reality, this will never change.

LEWIS BUTTERS: Today I think too much modern equipment is ruining the fishing, it's made it too easy, to my way of thinking anyway, and the fish won't stand it. I don't know what you think about it?

IVAN CHASTON: I mean, they're still out there against the sea today, they got more modern aids to help fight it, but they're still against the sea now. But there's still boats being lost, with all the modern equipment.