Gravitational Wave Astronomy

Can you find all the **bold** words?

B	N	N	W	O	D	G	N	I	R	F	N	T	E	E	F	Y	B
U	L	Z	T	M	P	U	E	C	L	C	J	I	K	O	T	F	N
I	V	A	W	V	B	Q	R	T	Q	A	N	L	D	I	L	R	S
G	N	E	C	H	M	F	X	A	F	S	R	K	V	F	O	A	U
A	Y	T	T	K	Q	U	P	K	T	J	V	I	C	C	G	W	P
M	T	U	E	D	H	Q	L	E	G	S	T	N	P	G	I	D	E
M	I	M	P	R	I	O	I	L	F	A	N	Y	B	S	L	E	R
A	V	K	D	U	F	N	L	X	L	A	J	O	A	L	N	T	N
R	A	E	X	T	R	E	M	E	M	A	S	S	R	A	T	I	O
A	R	Y	F	O	S	V	R	B	I	N	A	R	Y	T	P	H	V
Y	G	T	H	G	I	L	F	O	D	E	E	P	S	U	U	W	A
B	A	J	A	R	A	G	W	V	M	Q	Q	W	P	M	L	E	A
U	J	M	G	R	N	S	P	A	C	E	T	I	M	E	S	H	N
R	A	O	E	A	G	V	C	C	S	L	T	F	X	A	A	J	Z
S	D	N	B	R	U	A	Y	W	X	V	N	E	A	J	R	H	J
T	E	G	K	M	G	V	K	L	M	T	U	S	R	L	S	M	K
G	I	O	D	C	R	E	S	A	L	J	I	J	S	V	E	J	P
B	N	E	I	I	Y	H	R	E	J	L	Z	U	X	P	L	M	A

Gravitational wave astronomy is a new means for observing the Universe. We hope to make many discoveries over the coming decade. To find out more, visit our website:

goo.gl/R5Puq

Gravity is the force that keeps us on the Earth, and the Earth orbitting the Sun. **Einstein** described gravity with his theory of **General Relativity**. This explains gravity in terms of the curvature of **space-time**.

Gravitational waves are tiny ripples in spacetime that travel at the **speed of light**. They are made by accelerating masses, for example **binary** systems which may include a **white dwarf**, **neutron star** or **black hole**. These **inspiral** as they orbit because gravitational waves carry away energy. Eventually the binary companions will collide, which may result in an explosion: a **gamma ray burst**.

One of the loudest sources is the **merger** of supermassive black holes found in the centre of galaxies. Following merger, the new black hole undergoes a **ringdown** period: it emits gravitational waves like a bell emits sound waves. Gravitational waves are also produced when a stellar mass black hole orbits a supermassive black hole, these are called **extreme-mass-ratio** inspirals.

We might even be able to detect gravitational waves from **supernova** explosions or echoes leftover from the **big bang**.

To detect gravitational waves we look for tiny distortions in spacetime. We can use a **laser** to measure differences in length in an **interferometer**, or look for deviations in the arrival of signals from **pulsars**. There are several ground-based interferometers being constructed including **LIGO** in America, **Virgo** in Europe and **KAGRA** in Japan. There is also an idea to put a giant interferometer in space. This is called **LISA**.