

Relativistic Electrodynamics

RED.4

Show that

1. the temporal order of two events is the same in all reference frames if and only if they are separated by a time-like interval **[2 marks]**
2. there exists a reference frame in which two events are simultaneous if and only if they are separated by a space-like interval **[2 marks]**
3. for any time-like vector there exists a frame in which its spatial part is zero **[2 marks]**
4. any vector orthogonal to a time-like vector must be space-like **[2 marks]**
5. with one exception, any vector orthogonal to a null vector is space-like, and describe the exception **[2 marks]**