Historical Development of Quantum Mechanics (Some scientists were not discussed in the previous set of notes. Go to Wikipedia to find out more.) Niels Bohr (1913) - Bohr J.J. Thomson (1897) -Ernest Rutherford (1909) – Atomic **Energy Shell Atomic Model Nuclear Chemistry** discoverer of Electrons. Nuclear Model (explains the emission and Wilhelm Röntgen (1895) – X-ray (Cathode Ray Tube) (Gold Foil Experiment) absorption spectrums of different Henri Becquerel (1896) -**Plum Pudding Model &** worked with Hans Gieger & Ernest elements) – *realized his early* Uranium is Radioactive Masden (1909) – developed first **Mass Spectrometry** model as incomplete and limited Marie Curie (1898) – discoverer radiation detector (Gieger Counter) of Radium (emitter of alpha-, betas- and gamma- rays) Werner Heisenberg (1924) -Ludwig Boltzmann (1877) **Uncertainty Principle** developed an equation to Wave-Particle Duality of Light (one cannot be certain of the position calculate Probability (Light is both a wave (E-M and momentum of an electron – the act (Density) Distribution of radiation) as well as particles of observing changes its nature) -**Position and Momentum** (photons)) worked with Max Born and Pascual Max Planck (1900) - Quantized of Single Particle Jordan to develop a matrix-based **Light Energy Hypothesis** equation to the uncertainty principle (Light are absorbed and emitted in discrete amount of energy) Wolfgang Pauli (1924) – Pauli Modern Ouantum **Exclusion Principle** Albert Einstein (1905) - proved Particle-Wave Duality **Mechanics** (each atomic orbital (cloud) can the existence of photons of Matter (Outlines the structure of only occupy by a maximum of two (Electron is both a (Photoelectric Experiment) an atom where electrons electrons due to their opposing spin particle as well as a exist as probability - which creates two opposing wave – has wave distributions – densities magnetic pole directions) property like diffraction) Louis de Broglie (1924) or clouds with Particle can Behave Like Waves relativistic properties) (electrons when moving at high Erwin Madelung (1925) speed can attain wave like **Aufbau Principle** properties – electron waves) (electrons are placed from **Paul Dirac** (1928) lower energy orbitals to **Relativistic Ouantum Model** higher energy orbitals) (connected Einstein's Theory of Erwin Schrödinger (1925) -George Thomson (1925) -Relativity with Heisenberg **Electron Diffraction Schrödinger Wave Equation** Friedrich Hund (1925) – Hund's Rule Uncertainty Principle and (mathematical standing wave (proved that electrons can (electrons have to be unpaired when prediction of positron – diffract (a wave property) equations to describe electron initially placed into p, d, f-orbitals until antimatter of an electron) when moving at high speed) wave in a hydrogen atom) each orbital orientation is occupied)