

POINT 1

References and online Reading materials -

1. For a comprehensive discussion about different aspects of the way science works and fails, what can be strongly recommended for the beginners is:
Scientific Revolutions, ed. Ian Hacking, Oxford University Press, 1981
2. For an overarching account of Reactions against Newtonian Metaphysics as well as the concept of Explanation in Science:
A Hundred years of Philosophy, John Passmore, Duckworth, 1957, Chapter 14
3. For a more general and wider spectrum of social reactions in Europe to the early scientific discoveries during the 18th century or so, there are many wonderful books. Here is a recent one: The Age of Wonder: How the Romantic generation discovered the beauty and terror of Science, Richard Holmes, Harper Collins, 2008
May I further draw your attention to the numerous literary creations by the continental Poets as well as Painters during this period, capturing this beauty and terror? Indian readers might not have forgotten the first ever Science Fiction written during the early 19th century inspired by the earliest phases of discovery of Electricity, namely *Frankenstein* by Mary Shelley.)
4. About the metaphysical notion of Individuation and Identity and how do they figure in the language of Physics as a whole and on common sense ontology and the language of Physics, see:
 - i) Identity in Physics, A Historical, Philosophical and Formal Analysis by Steven French and Decio Krause, Clarendon Press, Oxford, 2006, chapters 1 and 2
 - ii) Post H, Individuality and Physics, The Listener, vol. 70, 1963
 - iii) Weyl H., Philosophy of Mathematics and Natural Science, Princeton University Press, 1949
 - iv) Schrodinger E., Science and Humanism, Cambridge University Press, 1952 (this book captures Schrodinger's final version of his interpretation of quantum mechanics where he was ready to dispense with even the identity of the quantum mechanical entity, thus ignoring the threat to violate Leibniz's Principle of identity of the indiscernibles! This standpoint provides the basis of Non-Standard Logic developed by a Brazilian group of logicians ever since the 90s of the last century)
 - v) Interpreting Bodies, Classical and Quantum objects in Modern Physics, Elena Castellani, (ed.) Princeton University Press, 1998
 - vi) For a wonderful general discussion about the role of Metaphysics on Human Thinking as a whole, see:
The Possibility of Metaphysics, E J Lowe, Clarendon Press, Oxford, 1998, chapter 1
 - vii) For more specific accounts of how common sense ontology figures itself in the Language of Physics, see:
 - Quantum Physics and the Human Language, James B. Hartle, 2006 (arxiv: quant-ph/0610131v3)
 - Tense and Indeterminateness, Simon Saunders, Phil. Sci; 33, 637-661, 2000
 - The Physics of 'Now', Simon Saunders, American journal of Physics, 73 101-109, 2005
5. Jodhpur Dialog [https://nalandadialogforum.wordpress.com/qinfo_13/] See particularly the Background Note in School Program and Study materials

POINT 3

References and online reading materials

1. There are so many good beginners account of Quantum mechanics for non-technical audience. Let me propose only two here:
 - i) Alastair Rae, Quantum Physics, Illusion or Reality, Cambridge, 1986
 - ii) The Ghost in the Atom, edited by P C W Davies and J R Brown, Cambridge University Press, 1986
2. There is probably no comprehensive non-technical account, at the best of my knowledge, of the photon story which can serve our purpose of Dialog. Here we include in this history also to the departure from the 'known' particle ontology in philosophical sense. Some useful materials can only be accumulated from different sources like:
 - i) G. Venkataramana, Bose and his Statistics, University Press, 1992 (this book is a mixed account in technical language as much as optimally needed to understand the conceptual dynamics. But, there is no reference to anything like departure from particle ontology in logical or philosophical sense*)
 - ii) Don Howard in Potentiality, Entanglement and Passion-at-a-Distance, Quantum Mechanical studies for Abner Shimony, Vol. 2, ed. Robert S. Cohen, Michael Horne and John Stachel, Boston Studies in the Philosophy of Science, Kluwer Academic Publishers, 1997 (an excellent survey of the phases of developments of Photon story and Einstein's worry)
*For different technical levels of discussion about the departure of the photon as well as of any quantum mechanical entity in general from the 'accepted' particle ontology (on the logico-

philosophical aspects of the problem) see:

- Neither Name, Nor Number, F.Holik, arxiv:1112.4622v1[quant-ph], 20 December'2011
- Is Priscilla, the trapped positron, an Individual? in Quantum Physics, the use of Names, and Individuation, Decio Krause, 2011 (available in Net)
- Particles, Particle labels, and Quanta: the toll of unacknowledged Metaphysics, M. Redhead and Paul Teller, Foundation of Physics, Vol. 26, no. 1, 1991

3. Free will and Entanglement –

There are plenty of materials available on the internet on Free will and Entanglement. You will get discussions with stress on both philosophical as well as physical perspective. Better to make your own choice!