

“Epistemic Matter”	“Epistemic Dark Matter”	“Epistemic Dark Energy”	“Epistemic Tunnelling”
Old EBs (implies also old yet unsolved open problems)	New <i>non</i> -EB-like information that is <i>consistent</i> with old EBs (can also include open problems that are already implied in old EBs but are yet unknown) i.e., that can be deduced from old EB material	New <i>non</i> -EB-like information that is <i>inconsistent</i> with old EBs but can be assembled from old EB material (can include creatively stimulating new divergent statements, new divergent questions, but also nonsense)	New EBs
<i>Known Known</i> and <i>Known Unknown</i>	<i>Unknown Known</i>	<i>Unknown Unknown</i>	<i>New paradigm</i> (solves old problems, will introduce a novel transformation; will lead to a novel <i>Known Known</i> , <i>Known Unknown</i> , <i>Unknown Known</i> and <i>Unknown Unknown</i> )
Type-I-copiable via imitation	Type-I-minable via planning algorithms	Type-I-producible via probabilistic generation	Can only reliably be achieved by Type II entities via selection/rediscovery of critical mutations applied on simulated <i>Unknown Unknown</i> fluctuations
Example: Knowledge graphs, GPT-4	Example: AlphaGo, human psychologists analysing unconscious patterns of clients	Example: GPT-2, new styles of artists like Dali,...	Example: Step of Einstein leading from Newtonian gravity to general relativity
	Mining can be improved e.g., by better planning strategies, more energy efficient hardware, more time, better representations, hybrid approaches, more computing power, using lower-temperature language model outputs,...	Ability to stimulate creativity can be improved by using higher-temperature language model outputs, more diverse datasets, better utility functions, better quality of randomness (i.e., quantum randomness), wave interference simulations, probabilistic computing,....	Can be stimulated via integrating EBs in one’s affective niche to support eventual serendipity, REM sleep, lucid dreaming, some exposure to a few language model outputs, etc.



Fig. 1. Exemplary epistemic total order for the generation of new EBs (the instructions are loosely inspired by an essay of Frederick [47]). Each glue operation  $x$  is indicated via a label  $G_x$ . EBs are a special form of explanatory information (EI) obtained by interweaving EI blocks via the step-by-step application of rational procedures sampled from a robust explanation-anchored, adversarial and trust-disentangled epistemology. Thereby, “trust-disentangled” signifies that the epistemic modus operandi is grounded in agreed upon criteria for *better* EBs i.e. it is orthogonal to any trust relation between involved entities – which means a better EB must be formulated such that metaphorically speaking it appears to defend itself against adversarial candidate EBs. In science, the specification of (direct or indirect) empirical tests in  $G_4$  is *the default* – but science is quintessentially explanatory [48], [49] and not merely based on data.