Towards making metastability more precise in neuroscience

1. Definition of metastability

1. Metastability is a term already used in many scientific areas, with a precise definition. In neuroscience, it is used in a loose way.
2. Mini-review: examples of different views/definitions of metastability in the neuroscience literature.
3. Definitions can be put in a few categories: observation-based, phase-space based. Definitions based on phase space are not as useful in practice, since often one does not know the phase-space structure. Operational definition?
4. An important difference in the observation-based definitions is in the scales considered **** GARANTIR ISSO ****
5. Definition: we propose a definition that (hopefully) captures the essence of the other definitions. Each definition in the literature then depends on the activity being observed (which depends on the scales and methods of analysis/observation)
6. Consequences of this definition: does it make the term very vague? isn't it then obvious that the brain must operate in a metastable regime? Yes, but this is not an issue, since the questions then move to other important points: how metastable is the brain (maybe maximally so)? what is the mechanism for generating this metastability? how do the different scales interact, and how metastability differs between them?

2. Degree of Metastability

1. Does it make sense to speak of degree of metastability?
2. How to measure metastability? Amplitude of oscillations, or characteristic times?

3. Metastability in different scales

1. Existence or not of metastability in different scales
2. Different degrees in different scales?
3. Importance of studying each scale and the relation between scales
4. Using a network as an example?

4. Mechanisms that can generate metastable behavior

1. Categorization and description
2. How does this mechanism operate in different scales?