Supporting Information

Modes of Synchrony in Self-propelled Pentanol Drops

Tanushree Roy[1], Sudhanshu Shekhar Chaurasia[1], J. M. Cruz[2], V. Pimienta[3], and P. Parmananda[1]

[1]Department of Physics, IIT Bombay, Mumbai-400076, Maharashtra, India
[2]Facultad de Ciencias en Física y Matemáticas, Universidad Autónoma de Chiapas, Tuxtla Gutiérrez, Chiapas 29050, Mexico
[3]Laboratoire des IMRCP, Université de Toulouse, CNRS UMR 5623, Université Paul Sabatier, 118 route de Narbonne 31062, Toulouse Cedex 9, France

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This file includes:

1. Extended time series showing autonomous oscillations for a single pentanol drop of 3 μl volume.
2. Average time period of oscillations observed for a single drop ranging a volume from 3 - 10 μl.
3. Dynamics of a single Pentanol drop (4 μl) experiencing succesive OPEN and CLOSE environmental conditions.
4. Extended time series showing out-of-phase oscillations for two pentanol drops (each drop volume is 3 μl).
5. Dynamics of two Pentanol drops (4 μl each) experiencing succesive OPEN and CLOSE environmental conditions.
6. Extended time series showing out-of-phase oscillations in the Relay mode for the three drop configuration (each drop volume is 3 μl).
7. Extended time series showing out-of-phase oscillations in the Relay mode for the four drop configuration (each drop volume is 3 μl).
8. Extended time series showing out-of-phase oscillations between two pairs of drops in the four drops configuration (each drop volume is 3 μl).
9. Velocity profiles in a short time window (i.e. 3 seconds) for each configurations corresponding to Figure 2(B), Figure 3(B), Figure 4(B) and Figure 5(B) respectively, in the manuscript.

Other supporting information includes the following:

1. Movie 1: Autonomous oscillations of a single 1-pentanol drop (3 μl).
2. Movie 2: Two drop configuration: Anti-phase synchronization (3 μl each).
3. Movie 3: Three drop configuration: Relay synchronization (3 μl each).
4. Movie 4: Four drop configuration: Relay synchronization (3 μl each).

5. Movie 5: Four drop configuration: Out-of-phase oscillations between two pairs of drops (3 μl each).
6. Movie 1a: Dynamics of a single pentanol drop of 4 μl volume showing transition from 'OPEN' to 'CLOSE' state corresponding to Figure S3(c)[last 10 seconds] to Figure S3(d) [First 20 seconds].
7. Movie 2a: Two Pentanol drops oscillations for 4 μl drop volume.
8. Movie 2b: Two Pentanol drops oscillations for 5 μl drop volume.
9. Movie 2c: Dynamics of two pentanol drops in 'Open' state corresponding to Figure S5(e) [First 8 seconds]
10. Movie 2d: Dynamics of two pentanol drops in 'Close' state corresponding to Figure S5(f) [From 50 - 80 seconds]
11. Movie 3a: Three Pentanol drops oscillations for 4 μl drop volume.
12. Movie 3b: Three Pentanol drops oscillations for 5 μl drop volume.

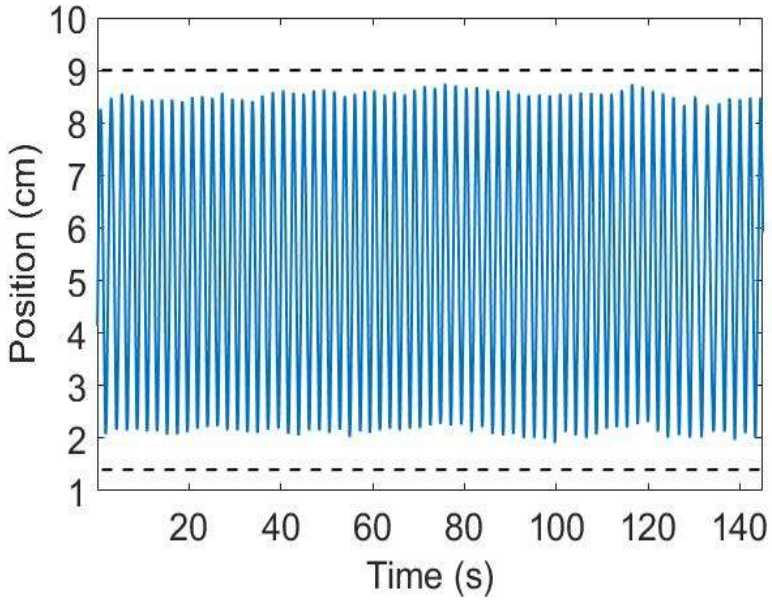

Figure S1: Extended time series showing autonomous oscillations for a single pentanol drop of 3 μl volume

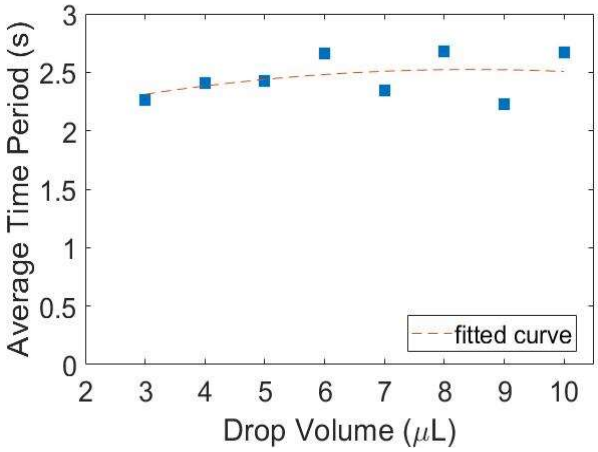

Figure S2: Average time period of oscillations observed for a single pentanol drop ranging a volume from 3 - 10 μl. The time period is calculated out of 15 oscillations everytime and averaged over three different sets of time series for each drop volume.

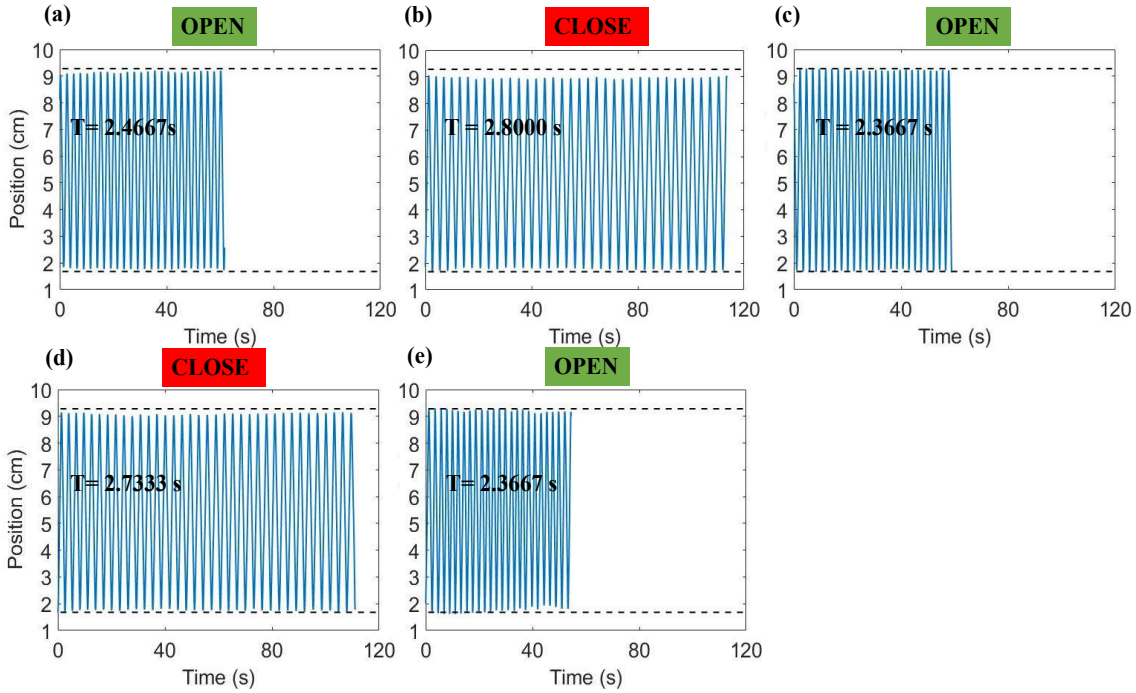

Figure S3: Dynamics of a single Pentanol drop (4 μl) experiencing succesive OPEN and CLOSE environmental conditions from (a) to (e): 'OPEN' signifies the solution being exposed to the air and 'CLOSE' signifies the solution being covered with a glass lid. 'T' implies the time period in each figure from (a)-(e). The time axes were kept same for all the plots to help visualizing the *fast* and *slow* dynamics related to OPEN and CLOSE configurations, respectively.

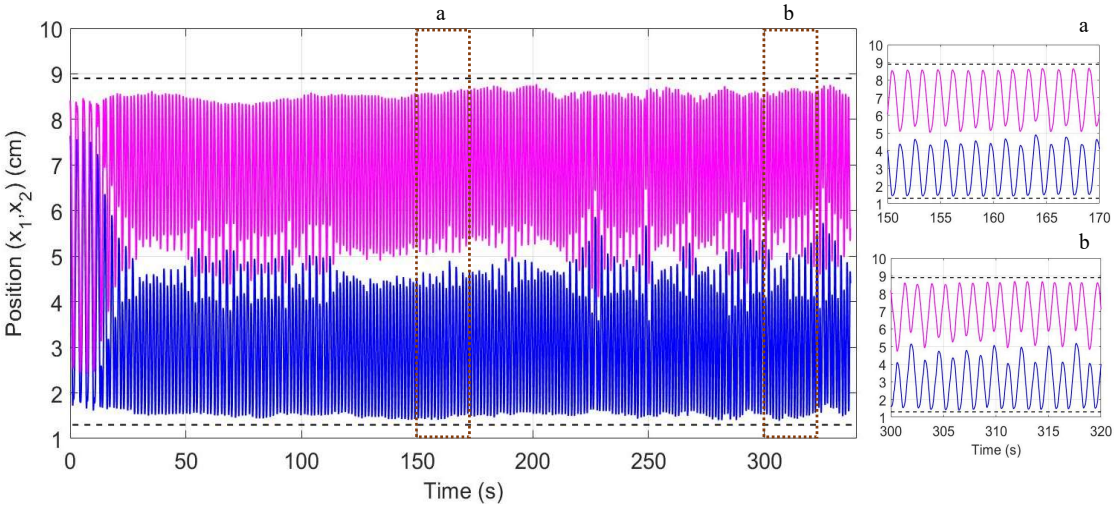

Figure S4: Extended time series showing out-of-phase oscillations for two pentanol drops. Each drop volume is 3 μl.

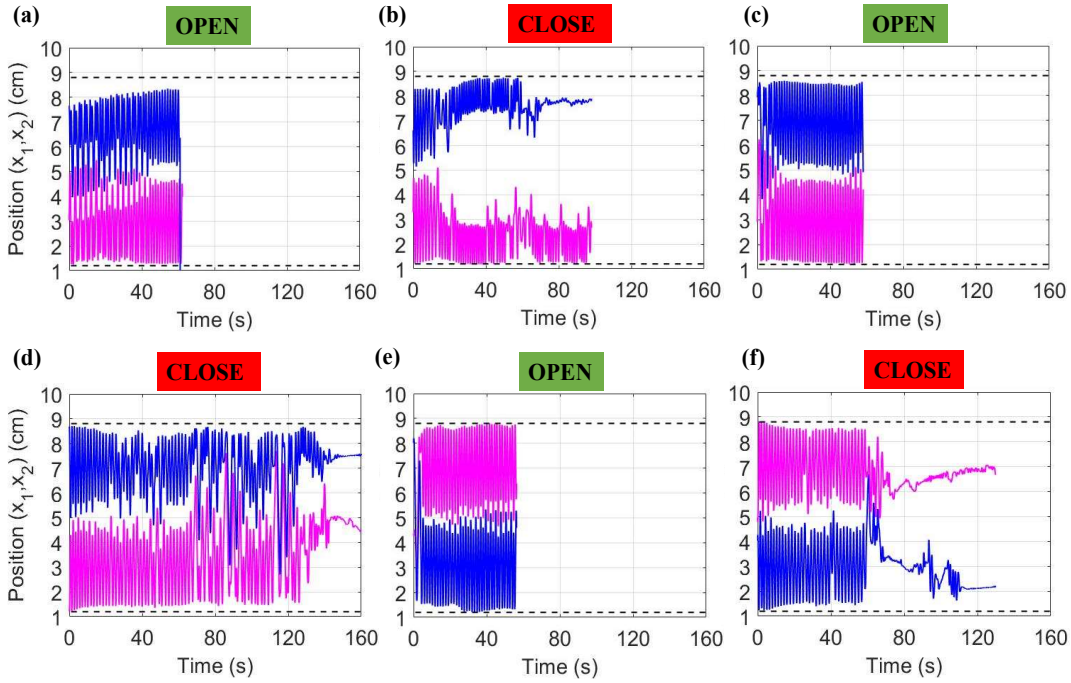

Figure S5: Dynamics of two Pentanol drops (4 μl) experiencing succesive OPEN and CLOSE environmental conditions from (a) to (f). 'OPEN' signifies the solution being exposed to the air and 'CLOSE' signifies the solution being covered with a glass lid. All the x axes are kept exactly the same. (a) The drops just started showing anti-phase oscillations following some transients; (b) the solution was covered with a glass lid following the completion of 60 seconds in (a) and the time series was recorded for about 100 seconds. The same protocol of opening and closing the solution was followed for the next configurations from (c) to (f) as well. From (d) to (e), the time series clearly show that the drops switch their sides and continue doing anti-phase oscillations. The first 8 seconds of the time series presented in (e), corresponding to that switching is shown in Movie 2c. (f) In this configuration, drops maintain to oscillate for a longer time before their quiescent states, mainly because of their reduced sizes (i.e. volumes). Drops' dynamics within 50-80 seconds of the time series presented in (f) are shown in Movie 2d.

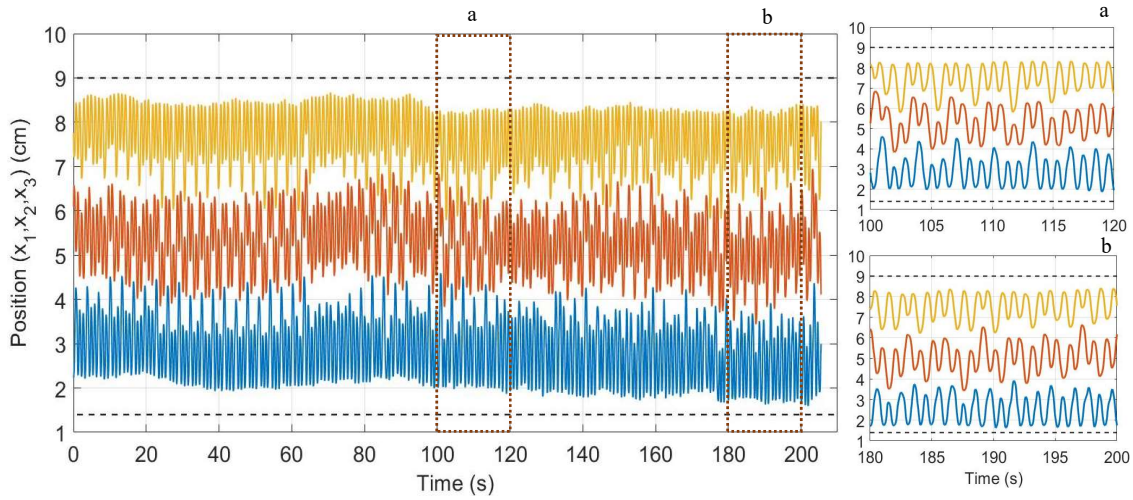

Figure S6: Three Pentanol drops dynamics: Extended time series showing out-of-phase oscillations in the Relay mode. Each drop volume is 3 μl.

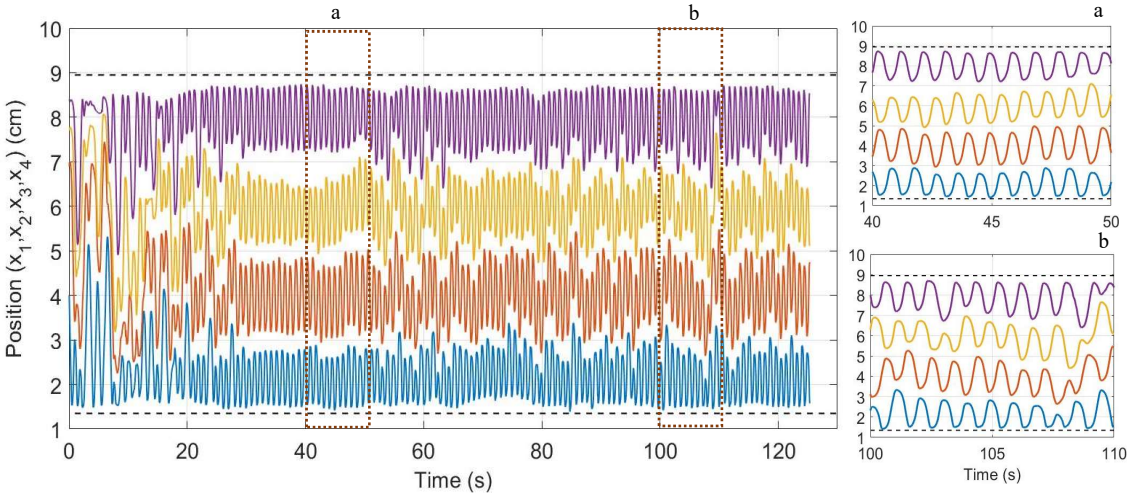

Figure S7: Four Pentanol drops dynamics: Extended time series showing out-of-phase oscillations in the Relay mode. Each drop volume is 3 μl.

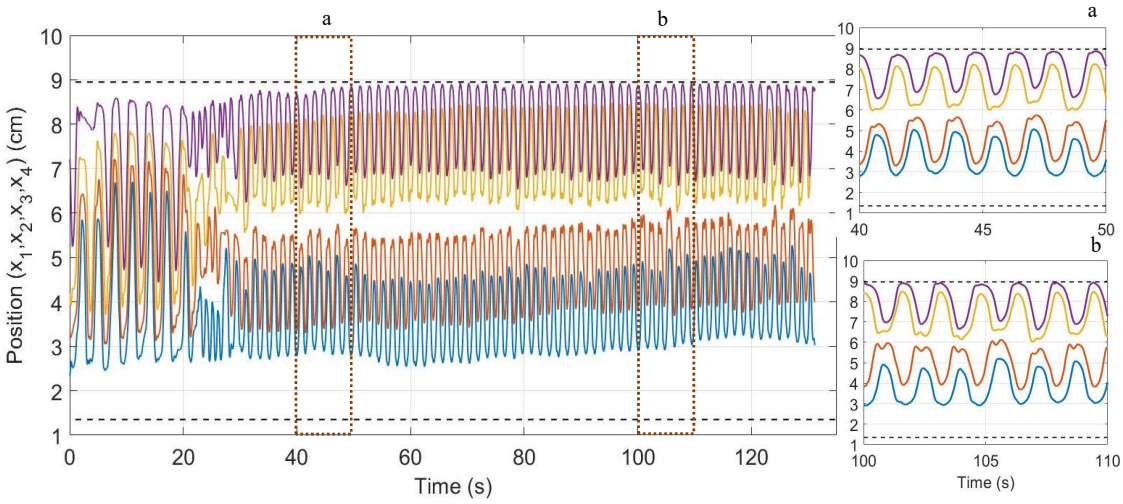

Figure S8: Four Pentanol drops dynamics: Extended time series showing out-of-phase oscillations between two pairs of drops. Each drop volume is 3 μl.

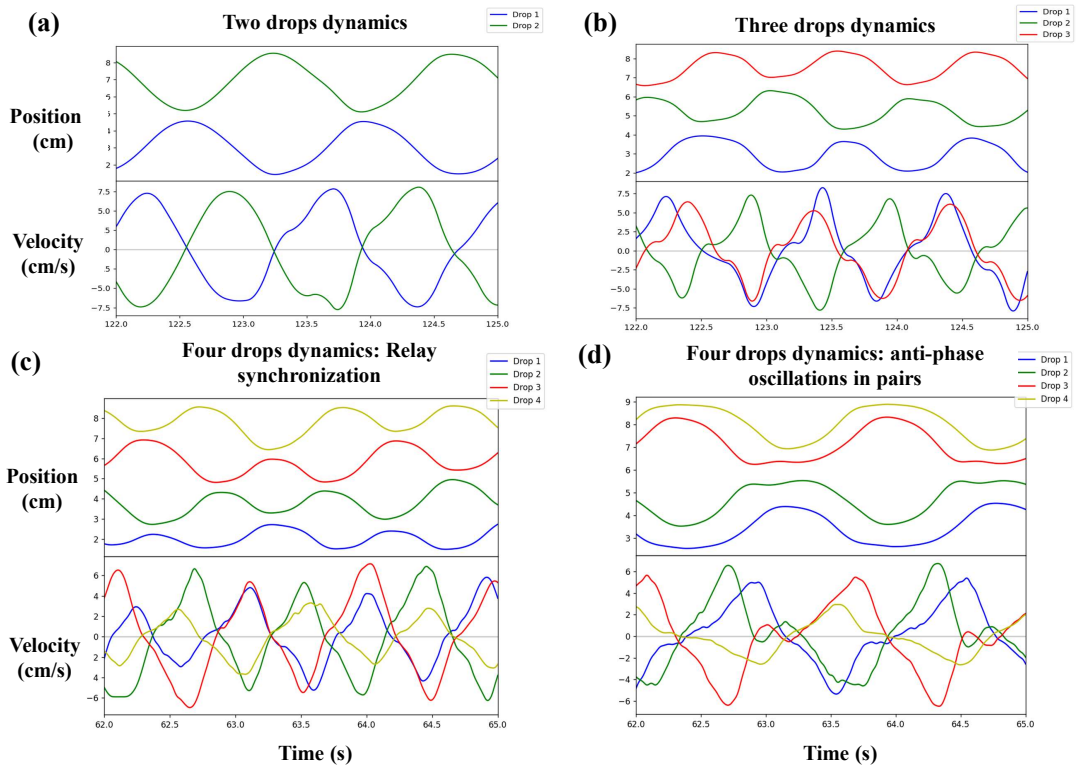

Figure S9: Velocity profiles for - (a) Two drops, (b) Three drops, (c) Four drops performing Relay synchronization and (d) Four drops performing anti-phase oscillations in pairs.