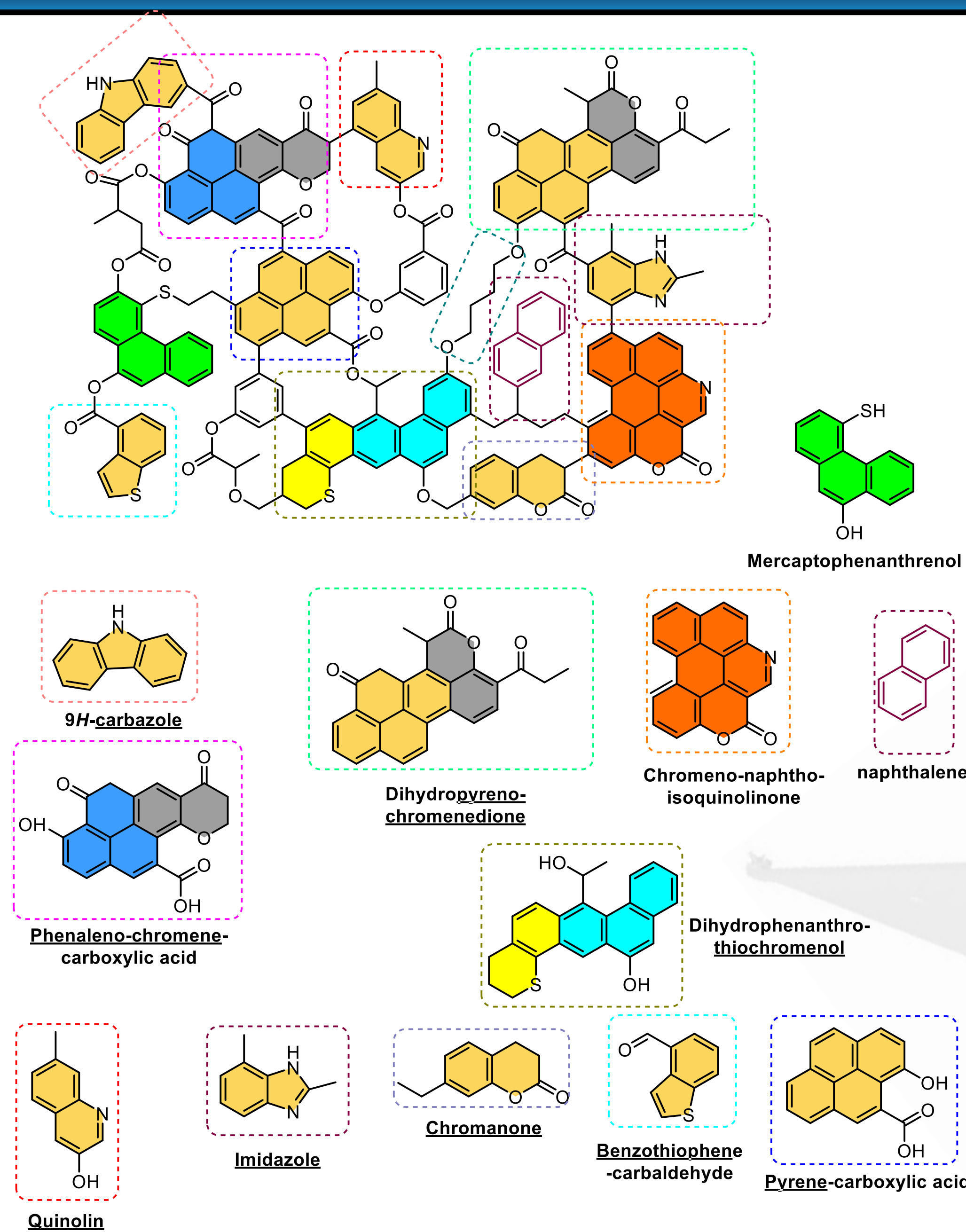


# 'SIGNS OF LIFE' IN MURCHISON 'IOM' MOLECULE ('M-IOM-M'): TRIPLETS OF TRIPLETS

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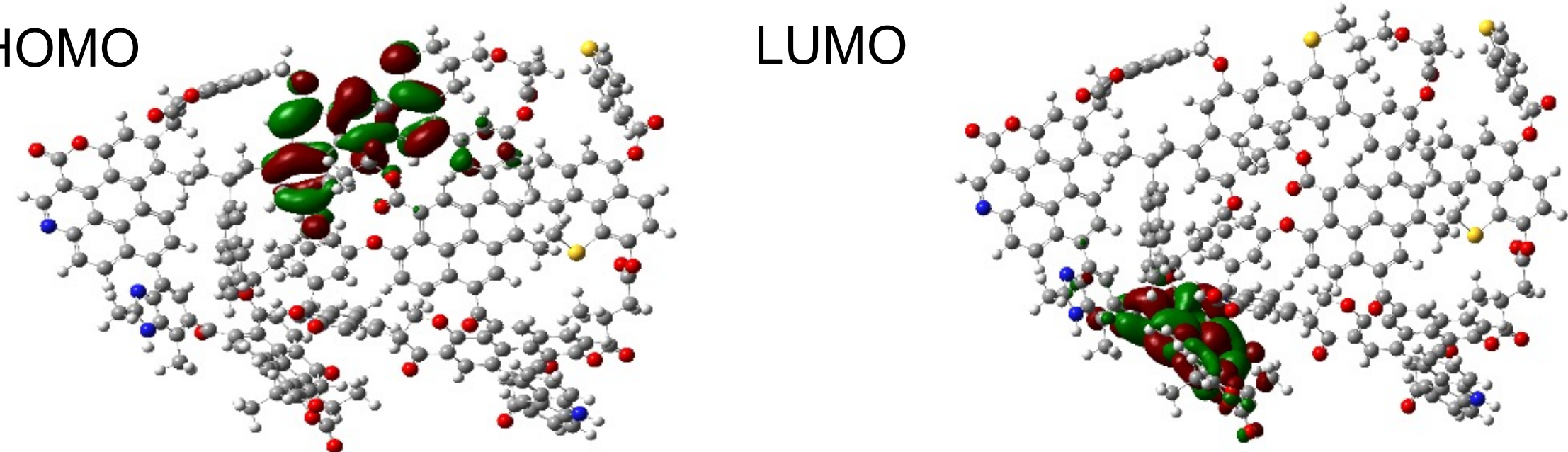
## MURCHISON IOM MOLECULE (M-IOM-M)



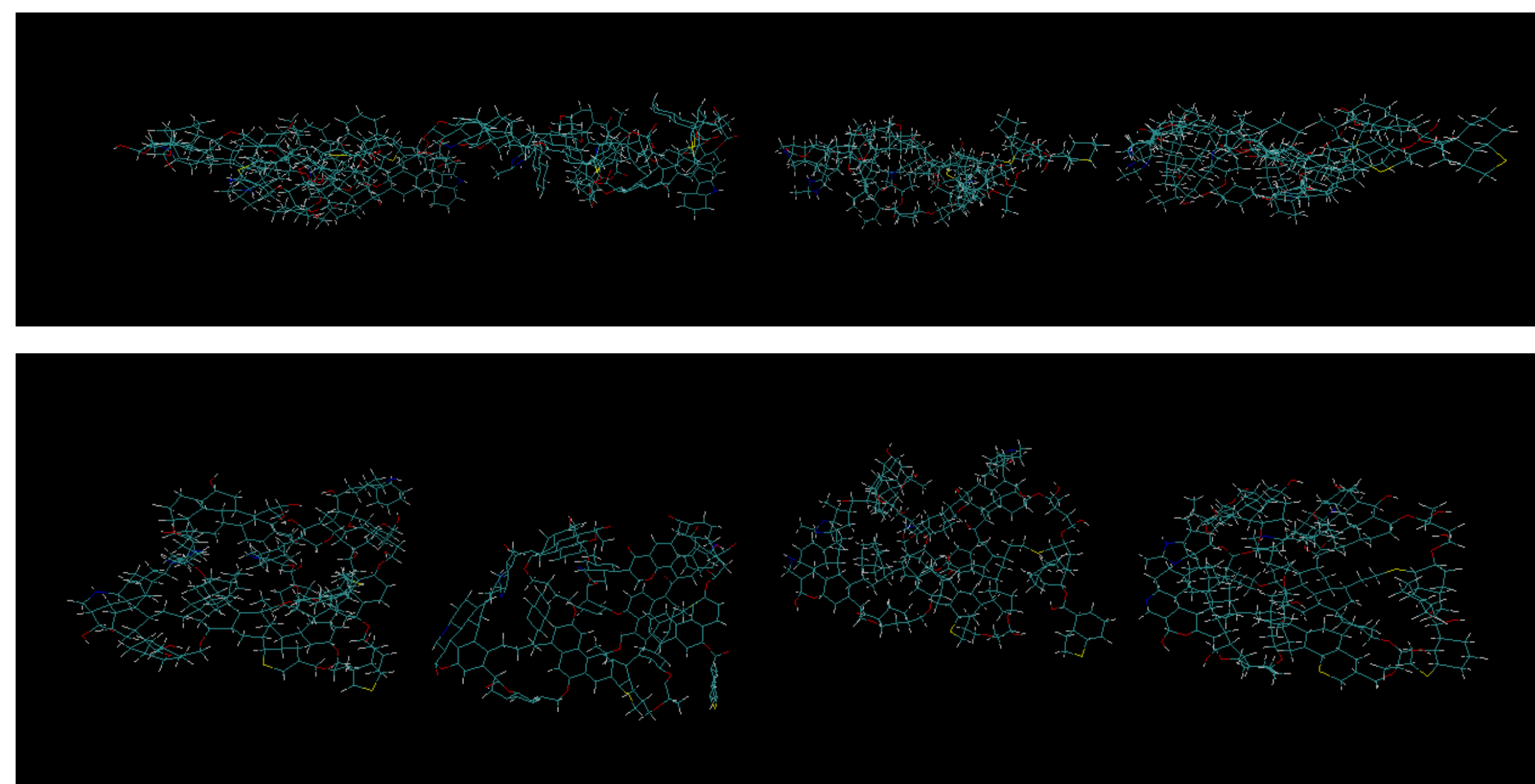
## ORBITALS & PROTOFILAMENT

Calculation Type	Calculation Method	Basis Set	Electronic Energy
SP	RB3LYP	3-21G	-11971.928979

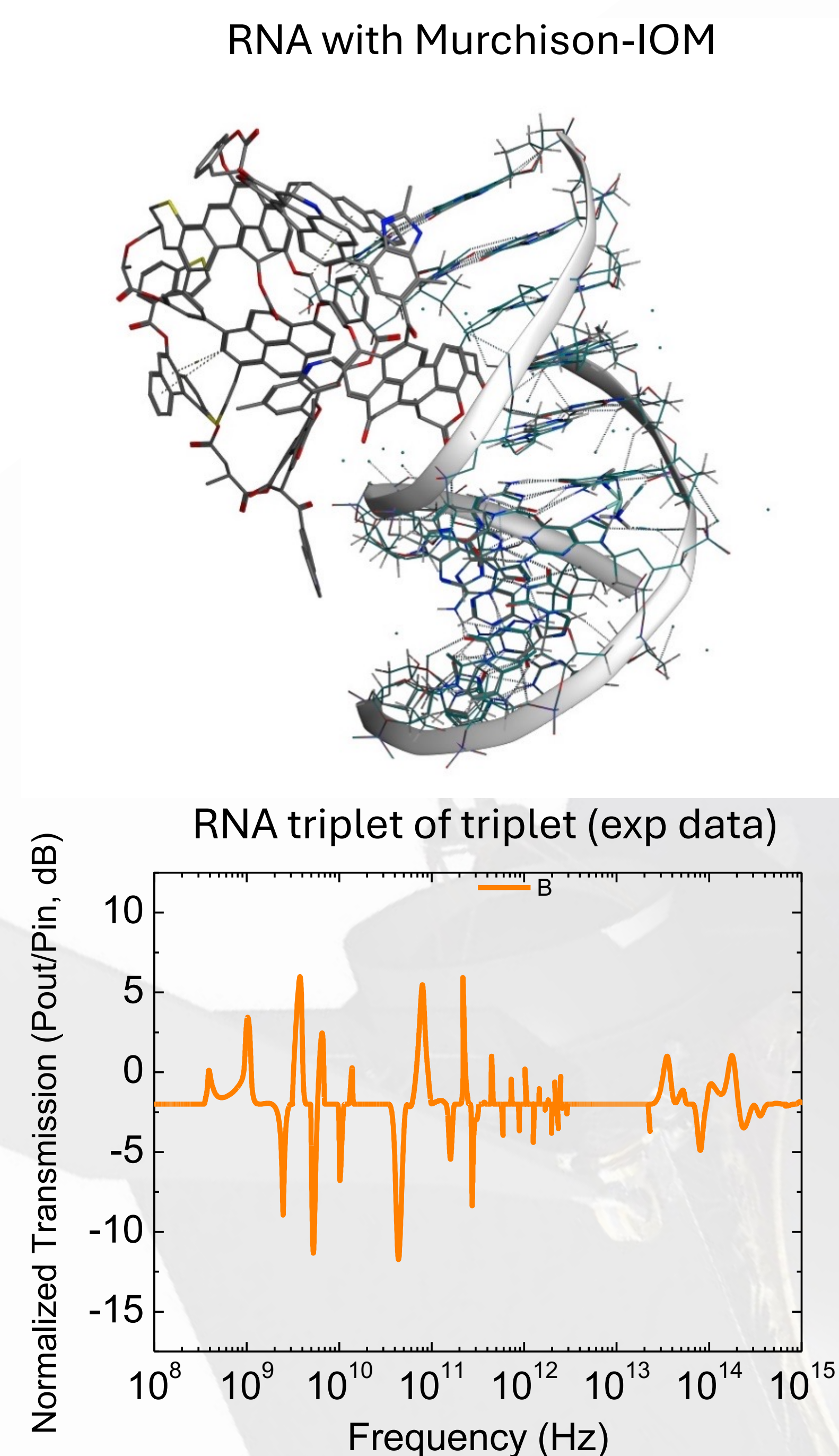
HOMO LUMO



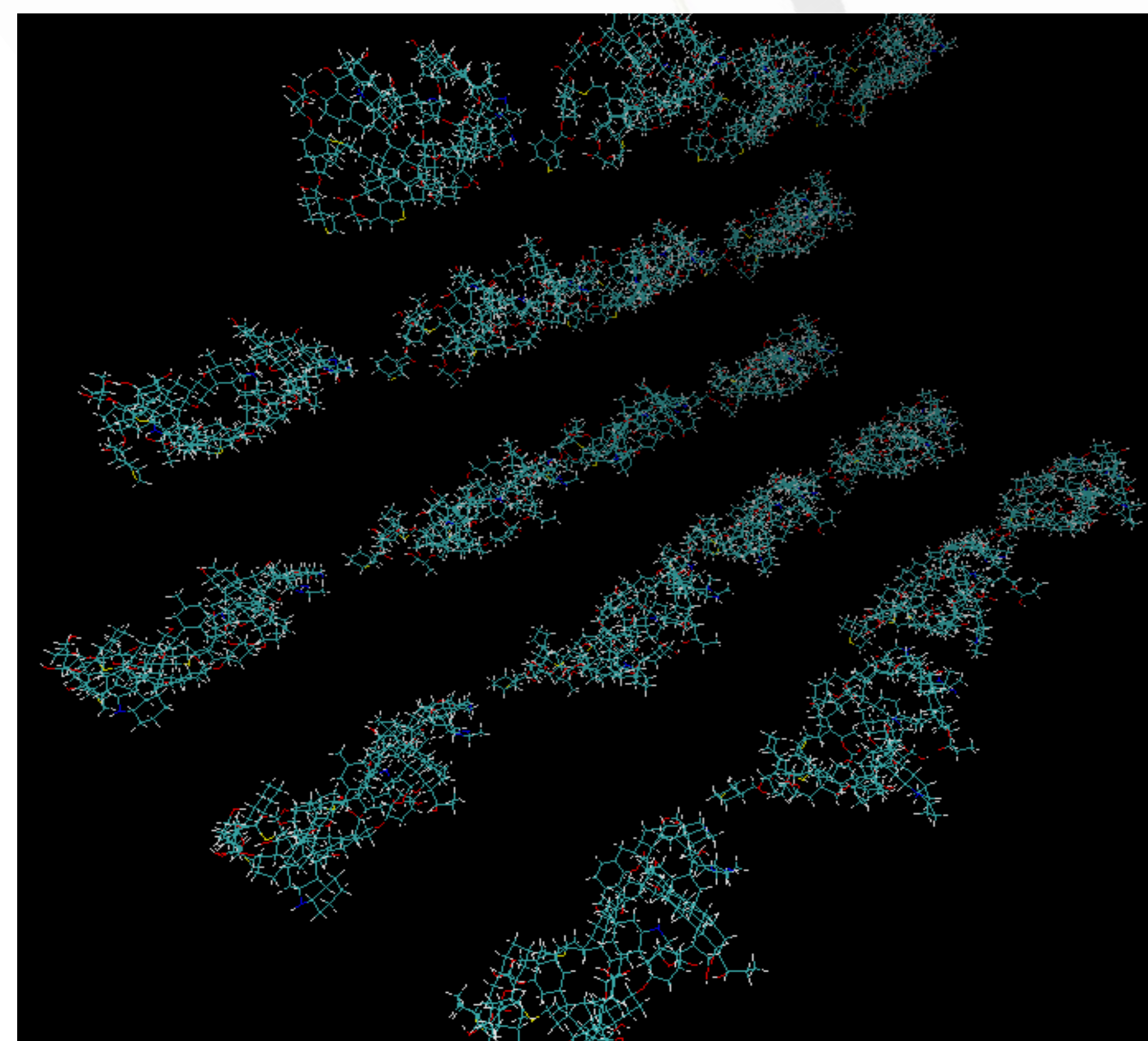
Murchison IOM molecules form microtubule-like protofilaments



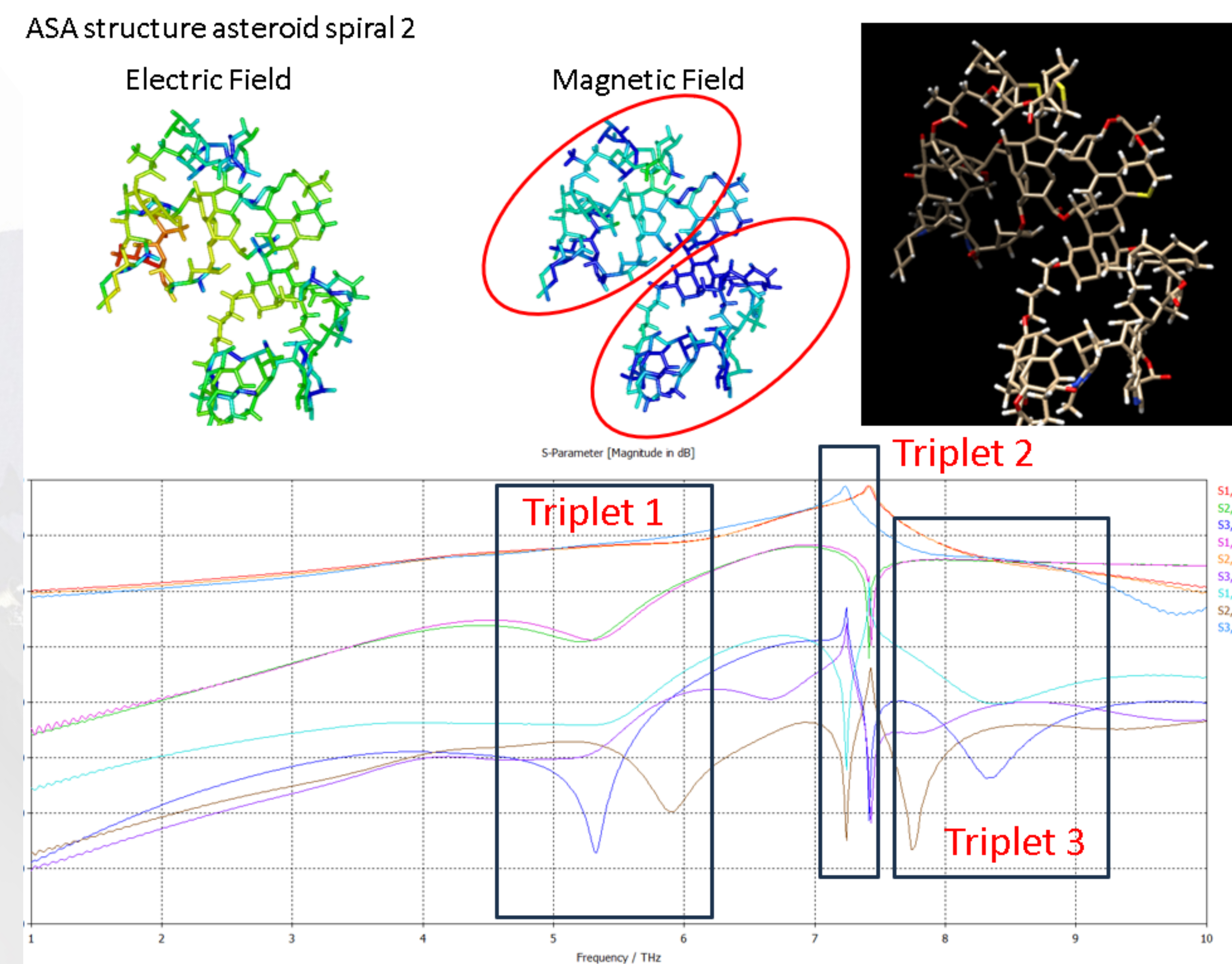
## M-IOM-M BINDS RNA



## PROTOFILAMENT ALIGN IN CYLINDER



## M-IOM-M VIBRATES AS TRIPLET OF TRIPLET



## CONCLUSIONS

- 'Triplets-of-triplets' resonance patterns are found at multiple frequency scales in biological microtubules, DNA, and RNA, and fundamental symmetry in the universe
- The Murchison IOM molecule (M-IOM-M) is a complex polycyclic aromatic hydrocarbon (PAH); other extraterrestrial molecules have similar structures.
- 3-dimensional modeling of M-IOM-M reveals 3 possible conformations, e.g. a cigar-shaped 'dimer' molecule of 2 nanometers (nm) length.
- Modeling also reveals M-IOM-M dimers align end-to-end, forming 'protofilaments' 8 nm or more in length.
- Modeling of multiple protofilaments reveal they align side-by-side with slight offset, and arrange in a cylindrical geometry, resembling microtubules.
- M-IOM-M conformer shows coherent petahertz oscillations with 'triplets-of-triplets'
- M-IOM-M and similar extraterrestrial molecules could be 'seeds' for microtubules and other functional biostructures.