

# The Mind-Modulated Music Interface

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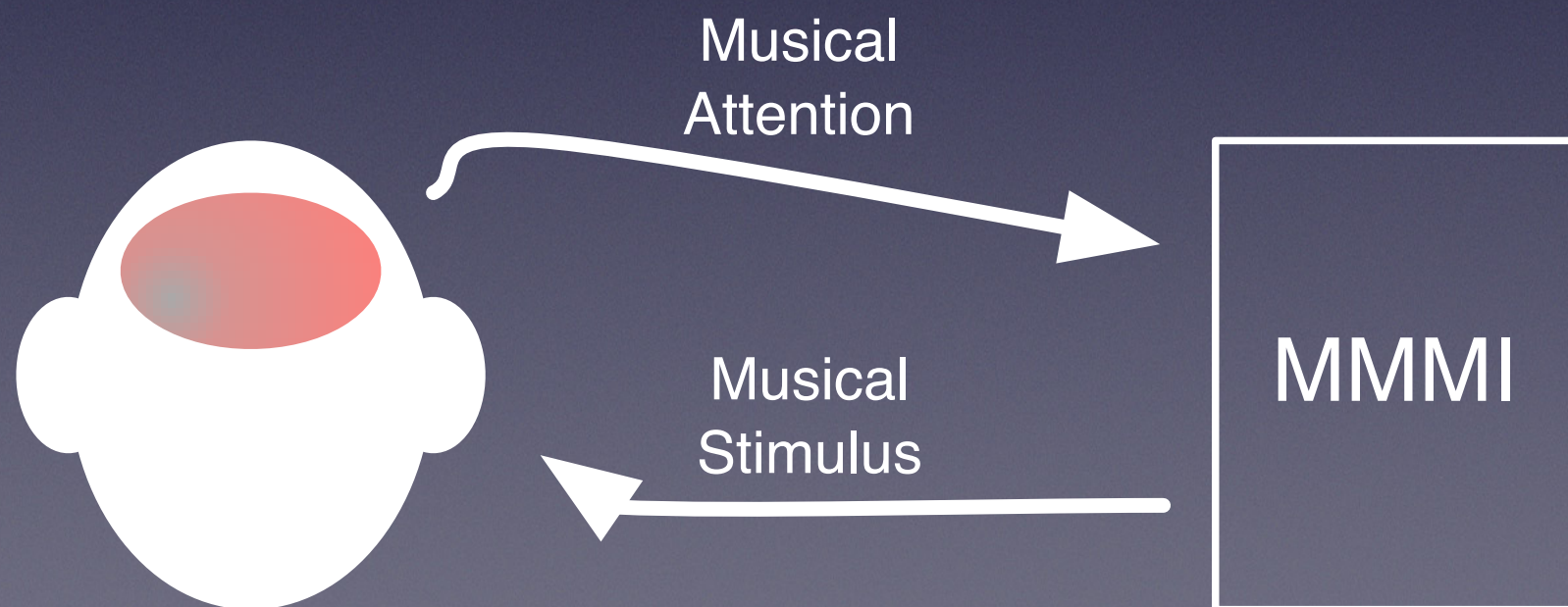
# Musical Interfaces

- Active musical experience
  - Playing a guitar
- Passive musical experience
  - Listening to a CD player
- Is it possible to blur this distinction?



# Mind-Modulated Musical Interface

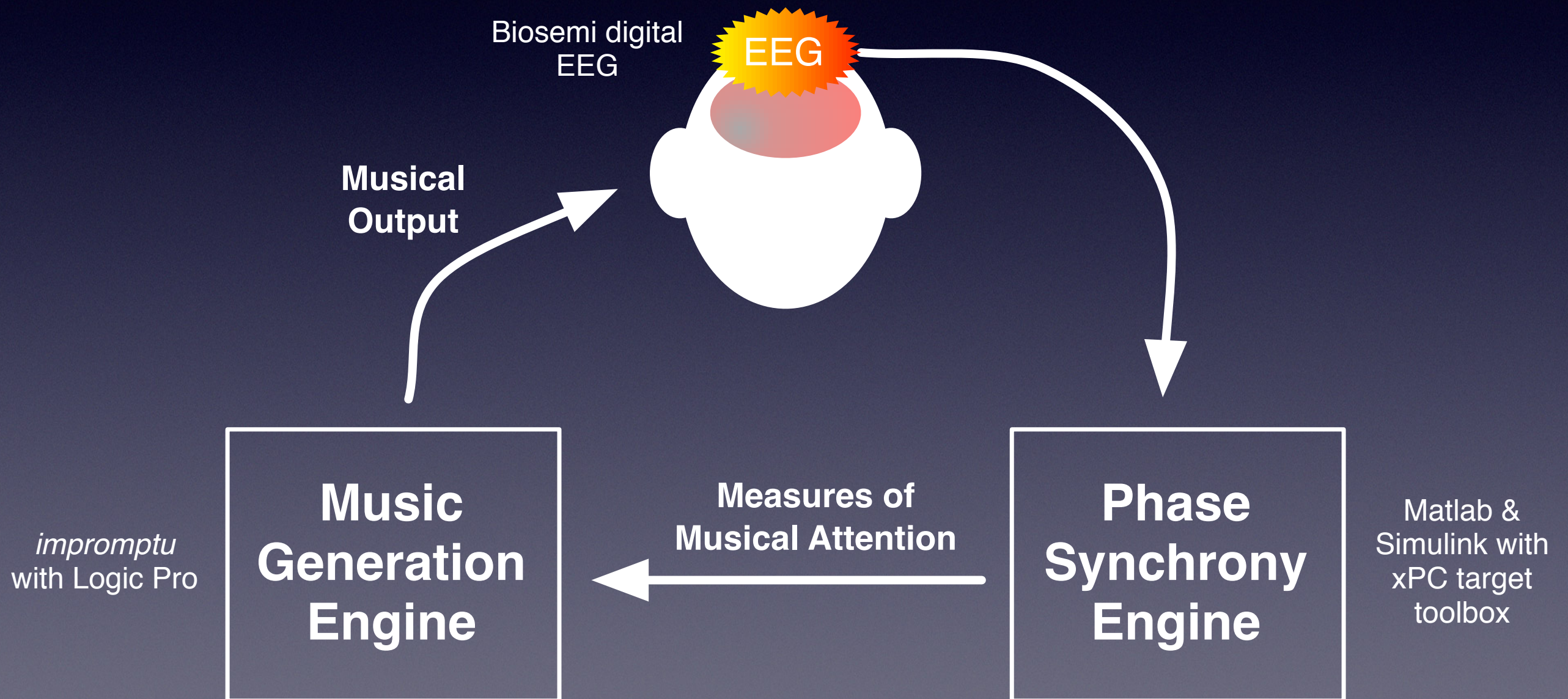
- New interface for music creation and experience
- Participant has no *direct* control over musical output
- Neural activity measured in real-time
- Musical output modulated by direct neural measures of the participant's *musical attention*





# MMMI Architecture

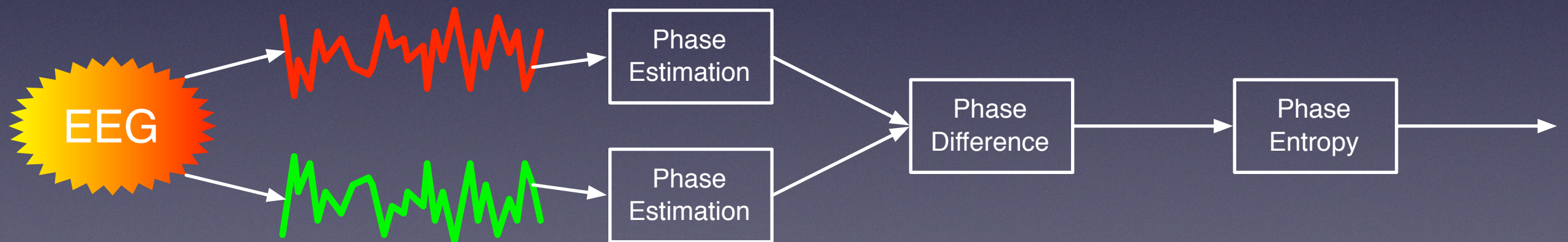
- Distributed system, custom communication protocol





# Phase Synchrony Engine

- Based on a result by Bhattacharya & Petsche (2005)
- Musical processing in the brain correlated with *phase synchronisation* in the EEG signal
- PSE uses a phase-synchrony detection algorithm to calculate (in real-time) an overall index of musical attention in the brain

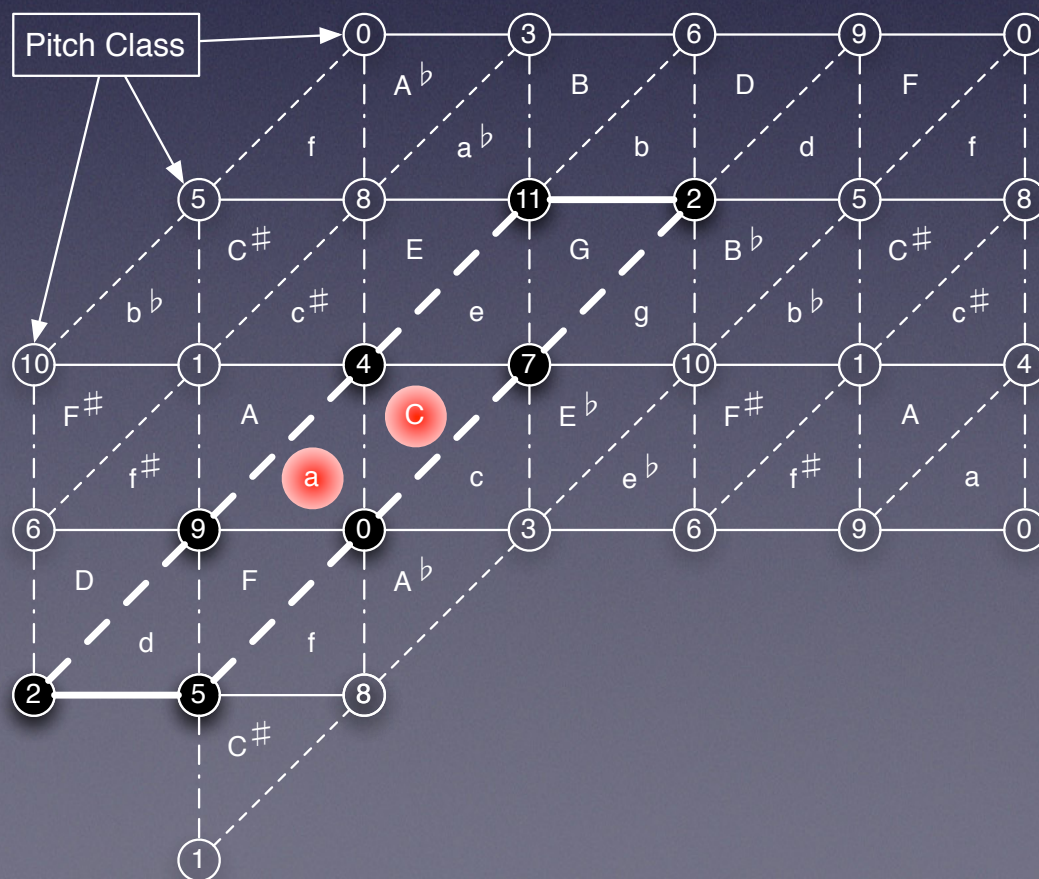


- Not the *definitive* measure of musical processing in the brain, but an interesting one nonetheless



# Music Generation Engine

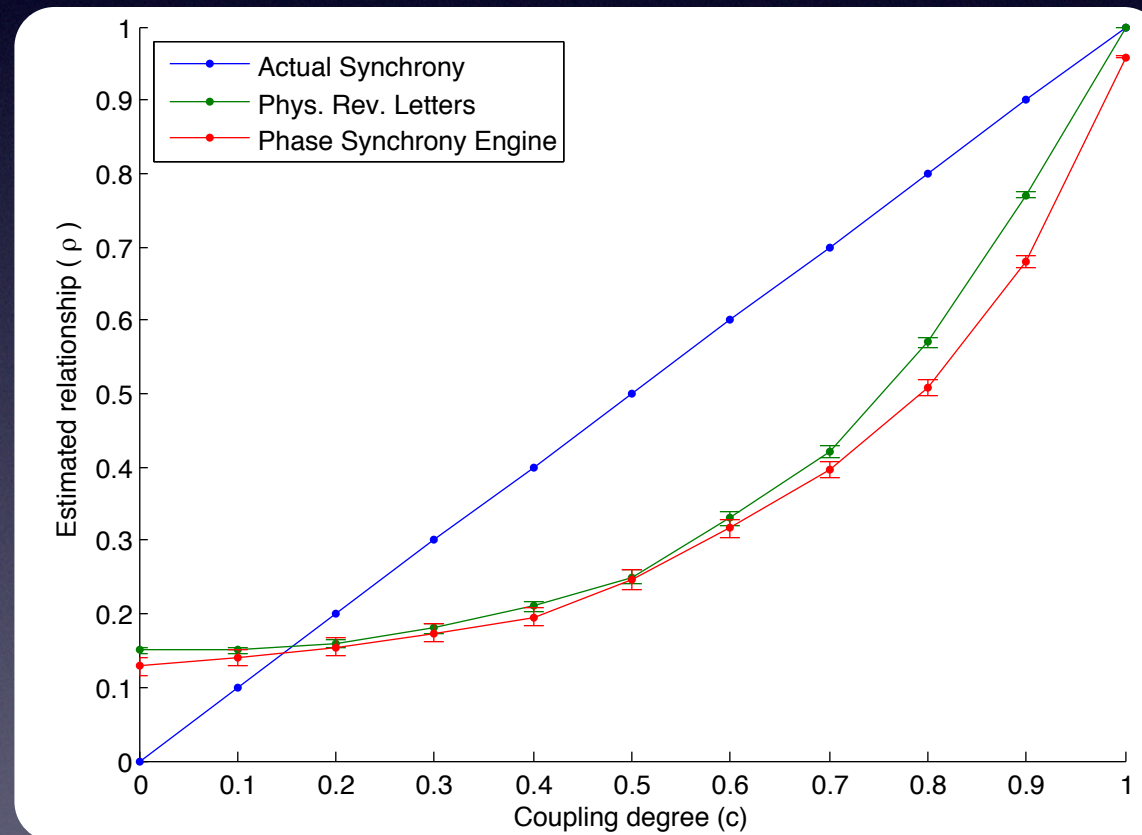
- What to do with this *musical attention* measure?
- Algorithmic composition
  - Generated music varying along a characteristic dimension
- MMMI approach: Markov processes in Euler's *Tonnetz*





# MMMI Status

- Work in progress
- Phase Synchrony Engine tested against validation data



- Music Generation Engine provides *attention-varying* musical output
- System ready for user tests







# Testing the MMMI

- Test if the musician *feels* the system is responsive
- Two conditions: responsive and random
  - Participants must determine which is which
- Basic test design used to avoid false positives
- Many parameters to tune, testing will be used to inform these parameter choices



# Conclusion

- The MMMI suggests a paradigm for the next generation of 'informed' artistic interfaces
- Investigate the way people listen and attend to music
- Lots of work still to be done, stay tuned for test results!



# Cheers

Any Questions?

Thanks to Dr. Henry Gardner, my research team, ANU  
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